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Crossing the Color Line: Racial Migration and the One-Drop Rule, 1600-1860

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Vertical Restraints and Intellectual Property Law: Beyond Antitrust

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INTRODUCTION

Sales and licenses of intellectual property (IP) and products incorporating IP often feature restrictions on use, transfer, and production.[1] IP owners have considerable freedom to fashion such restrictions, but they are constrained by contract and antitrust law as well as by certain doctrines within IP law.[2] The appropriate rigor of the constraints on the freedom of IP owners to market as they choose is hotly contested within law and economics.[3] Most commentary on this subject focuses on antitrust oversight, but—at least when it comes to vertical restraints[4]—constraints that are internal to

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1. *See, e.g.*, Lisa M. Bowman, *Court: Network Associates Can't Gag Users*, CNET NEWS.COM, Jan. 17, 2003, *at* http://news.com/2100-1023-981228.html ("End-user license agreements have become a hot-button issue in the tech industry as more and more companies try to forge increasingly restrictive contracts.").

2. *See, e.g.*, Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813, 1817 (1984) (noting that there is no exemption from criminal laws for patent license terms).

3. *See generally* Michael A. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PENN. L. REV. 761 (2002); Richard J. Gilbert & Willard K. Tom, *Is Innovation King at the Antitrust Agencies? The Intellectual Property Guidelines Five Years Later*, 69 ANTITRUST L.J. 43 (2001); Willard K. Tom & Joshua A. Newberg, *Antitrust and Intellectual Property: From Separate Spheres to Unified Field*, 66 ANTITRUST L.J. 167 (1997).

4. Following antitrust terminology, restraints that affect competitors are classified as horizontal, and restraints that affect users or suppliers are classified as vertical. Much of the antitrust analysis of vertical restraints addresses the effect of restraints on distributors and retailers. *See infra* note 10. In contrast, this Article mainly addresses the effect of restraints on end-

patent and copyright law are far more significant. Furthermore, unlike antitrust, patent and copyright law facilitate vertical restraints in important ways. This Article moves beyond antitrust and explores the extensive regulation of vertical restraints within IP law.[5]

There are four reasons to focus on IP oversight of vertical restraints separately from antitrust oversight. First, IP law covers a broader range of vertical restraints. It has broader coverage because it responds to a larger set of policy concerns and because it has more regulatory instruments. Antitrust reaches only certain kinds of vertical restraints that are especially likely to harm competition. IP law reaches anticompetitive restraints through the patent and copyright misuse doctrines,[6] and it reaches other vertical restraints that present policy questions usually not addressed in antitrust. IP law is more versatile than antitrust law because it regulates in two ways: by specifying entitlements, and by prohibiting certain contracts or practices.[7] Antitrust is limited to

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users.

5. This Article discusses mostly patent and copyright law; space constraints preclude discussion of the interesting role of trademark law in regulating vertical restraints.

6. Patent misuse occurs when the patent owner expands the scope or duration of the patent beyond the rights granted by the patent claims. Misuse can be purged, the patent is unenforceable until the misuse is purged, and no damages are allowed. Copyright misuse is patterned after patent misuse. The law of patent misuse recognizes two types of patent extension. The first type involves horizontal agreements between competitors who control products or processes that compete with the patented invention. The second type involves vertical restrictions on licensees' use. *See, e.g.*, WARD S. BOWMAN, JR., PATENT AND ANTITRUST LAW 54-56 (1973); *see also* HERBERT HOVENKAMP ET AL., IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW § 20.3 (2002) (distinguishing a vertical restraint from a horizontal restraint by asking whether competition between the parties is affected).

7. In addition to the misuse doctrine, IP law regulates vertical restraints through preemption (*see infra* text accompanying notes 211, 215-19), the patent law repair/replace doctrine (*see infra* Part IV), copyright fair use (*see infra* Part II), the copyright public performance right (*see infra* text accompanying notes 39-40, 55-57), the brown bag exemption to the Plant Variety Protection Act (*see* Asgrow Seed Co. v. Winterboer, 513 U.S. 179, 192 (1995)), the copyright provision governing ties between computers and computer maintenance (*see infra* text accompanying notes 128-32), the copyright mechanical license provision (*see infra* text accompanying notes 223-31), the patent and copyright contributory infringement doctrines (*see infra* text accompanying notes 133-40, 147-52), the copyright doctrine stating RAM copies count as copies under 17 U.S.C. § 106(1) (2000) (*see infra* text accompanying notes 107-09), the first sale or exhaustion doctrines (*see infra*

prohibitions.

Second, the economic analysis of the antitrust-IP conflict does not provide an adequate normative framework for analysis of the full range of IP doctrines affecting vertical restraints.[8] Both antitrust and certain IP doctrines (particularly misuse[9]) are concerned about the potential of vertical restraints to exclude downstream competitors.[10] But unlike antitrust, IP doctrines that regulate vertical restraints are often concerned exclusively with the impact of restraints on end-users. The proper normative framework resembles consumer protection law more than antitrust,[11] and the relevant question is how to resolve the consumer protection-IP conflict. Specifically,

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text accompanying notes 32-37, 63-65), and copyright amendments restricting record and software rental (*see infra* note 70 and accompanying text).

8. Most commentators see the misuse doctrine as an anomalous pocket of quasi-antitrust law that should be assimilated into antitrust. *See* HOVENKAMP ET AL., *supra* note 6, § 3.2b (stating that misuse occurs when the patent owner broadens the patent with anticompetitive effect); LAWRENCE A. SULLIVAN & WARREN S. GRIMES, THE LAW OF ANTITRUST: AN INTEGRATED HANDBOOK 884 (2000) (favoring identical standards for patent misuse and antitrust violations in tying cases).

9. HOVENKAMP ET AL., *supra* note 6, § 1.3 ("[N]ot all of the cases that fit within the intellectual property-antitrust rubric actually involved antitrust at all. The doctrines of patent (and more recently copyright) misuse serve many of the same purposes as antitrust law. . . .").

10. The antitrust law of vertical restraints is mainly concerned with the impact of restraints on the freedom of downstream firms to choose their own distribution strategy. *See* Andy C. M. Chen & Keith N. Hylton, *Procompetitive Theories of Vertical Control*, 50 HASTINGS L.J. 573, 575 (1999). Evidence for this claim is found by examining the leading private antitrust suits addressing vertical restraints. The plaintiffs are almost always downstream potential or actual competitors rather than end-users. *See, e.g.*, Eastman Kodak Co. v. Image Technical Servs. Inc., 504 U.S. 451, 455 (1992) (downstream competitor); Bus. Elecs. Corp. v. Sharp Elecs. Corp., 485 U.S. 717, 721 (1988) (retailer); Jefferson Parish Hosp. Dist. No. 2 v. Hyde, 466 U.S. 2, 5 (1984) (excluded downstream competitor); Monsanto Co. v. Spray-Rite Serv. Corp., 465 U.S. 752, 756 (1984) (distributor); Continental T.V., Inc. v. GTE-Sylvania Inc., 433 U.S. 36, 39 (1977) (franchisee). Hovenkamp, Janis, and Lemley list three basic competitive concerns that arise from vertical restraints: foreclosure; raising rivals' costs; and facilitation of collusion. *See* HOVENKAMP ET AL., *supra* note 6, § 20.1.

11. *See* HOVENKAMP ET AL., *supra* note 6, § 13.5a (noting that antitrust does not regulate monopoly pricing per se); Paul L. Joskow, *Transaction Cost Economics, Antitrust Rules, and Remedies*, 18 J.L. ECON. & ORG. 95, 102-03 (2002) (pointing out that contract and consumer protection laws are better suited than antitrust law to regulate contractual hazards arising in nonstandard vertical relationships); Bowman, *supra* note 1 (stating that the state court relied on consumer protection law and blocked enforcement of a software end-user license agreement that prohibited product reviews and benchmark tests).

economic analysis of vertical restraints and IP law must determine whether IP law should aid a seller's attempt to control: the economic life of a durable good;[12] sharing of copyrighted works and patented technology;[13] arbitrage that undermines price discrimination;[14] or a user's decision to exit the relationship.[15] I do not claim that antitrust judges and scholars are completely uninterested in these issues—only that they are peripheral to core antitrust concerns.

Third, antitrust scrutiny of IP protected markets is in a period of retrenchment.[16] Recently, some commentators have argued that the nature of competition in high-tech markets justifies a more relaxed antitrust treatment of those markets.[17]

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12. *See* Malcom B. Coate & Jeffrey H. Fischer, *Can Post-Chicago Economics Survive* Daubert*?*, 34 AKRON L. REV. 795, 841-42 (2001) (commenting on the social cost of market power derived from intellectual property protection "which reduces welfare by forcing consumers to replace their durable goods [too] quickly").

13. *See* Michael J. Meurer, *Copyright Law and Price Discrimination*, 23 CARDOZO L. REV. 55, 132-40 (2001) [hereinafter Meurer, *Price Discrimination*] (analyzing whether copyright owners should be allowed to control sharing by end users); Richard H. Stern, *Post-Sale Patent Restrictions After* Mallinckrodt*—An Idea in Search of Definition*, 5 ALB. L.J. SCI. & TECH. 1, 7 (1994) (stating that the *Mallinckrodt* decision created the doctrine that "a patentee may restrict use and disposition of patented articles and that violation of the restriction is patent infringement that [sic] unless the restriction violates some provision of positive law, such as the antitrust laws"). *See generally,* Michael J. Meurer, Sharing Copyrighted Works (Oct. 17, 2002) (unpublished manuscript, on file with the *Minnesota Law Review*) [hereinafter Meurer, Sharing].

14. Hovenkamp, Janis, and Lemley describe price discrimination as a "rejected concern" of the antitrust law governing vertical restraints. *See* HOVENKAMP ET AL., *supra* note 6, § 20.2c.

15. *Cf.* J.H. Reichman and Jonathan A. Franklin, *Privately Legislated Intellectual Property Rights: Reconciling Freedom of Contract with Public Good Uses of Information*, 147 U. PA. L. REV. 875, 955-57 (1999) (arguing that users should be able to negotiate licensing terms more freely and in some cases invoke a public-interest unconscionability defense to avoid certain terms).

16. *See* Linda R. Cohen & Roger G. Noll, *Intellectual Property, Antitrust and the New Economy*, 62 U. PITT. L. REV. 453, 473 (2001) (expressing concern that "in the future antitrust may have little or no role in high-technology industries, especially with respect to claims regarding monopolization of vertically related markets").

17. Some argue that competition is different in high-tech markets because market power is transitory in the face of the gale of creative destruction. Others argue that IP should be expanded and antitrust contracted to provide greater incentives for innovation. *Cf. id.* at 465 (explaining that the expansion of IP rights was motivated by a desire to redistribute income in favor of IP owners).

In particular, commentators debate whether vertical restraints connected to IP should be regulated at all.[18]

Fourth, because IP law uses different instruments it possibly offers more effective regulation of vertical restraints, and should be used to complement antitrust regulation.[19] IP law frequently offers two cost advantages over antitrust: less difficulty fashioning an appropriate remedy,[20] and lower rent-seeking costs from opportunistic or anticompetitive litigation.[21] Let me illustrate the advantages of IP law by considering the regulation of price discrimination. Regulation through antitrust requires a court to identify anticompetitive price discrimination, specify unacceptable pricing practices in great detail, and monitor compliance. In contrast, IP law indirectly regulates price discrimination by encouraging or discouraging arbitrage. For example, the Supreme Court recently discouraged geographic price discrimination by refusing to allow copyright owners to block importation of lawful copyright

18. *See* BOWMAN, *supra* note 6, at 64 (contending that such arrangements simply maximize legitimate profit attributable to the patent and should not be condemned through application of the leverage fallacy); HOVENKAMP ET AL., *supra* note 6, §§ 20.3, 20.18, 20.19 (noting that properly defined vertical restraints rarely violate antitrust). *But see* Cohen & Noll, *supra* note 16, at 463-64 (noting that exemptions to antitrust law, including the IP exemption, have been interpreted narrowly).

19. Antitrust is difficult to administer in hi-tech markets because trials are slow and the technology is difficult for the court to understand. IP law shares these administrative costs. *See* Joskow, *supra* note 11, at 99 (explaining that antitrust enforcement agencies do a much better job performing complex economic analysis than antitrust trial courts).

20. Crafting timely and precise antitrust remedies is a tough job in high-tech industries. *See* RICHARD A. POSNER, ANTITRUST LAW 101-04 (2d ed. 2001) (explaining social cost of divestiture as an antitrust remedy); SULLIVAN & GRIMES, *supra* note 8, at 77-80 (noting that divestiture and conduct-based remedies are difficult to implement effectively); Joskow, *supra* note 11, at 99 (explaining that antitrust remedies may fail to improve efficiency or even make matters worse); *id.* at 113-14 (reviewing an FTC study that casts doubt on the ability of antitrust enforcement agencies to formulate effective divestiture policies); Robert Pitofsky, *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, 16 BERKELEY TECH. L.J. 535, 547 (2001) (arguing that remedies should be designed so as not to undermine innovation, with a brief duration where appropriate, and to assure access to a bottleneck product or service).

21. For discussion of the rent-seeking costs associated with private antitrust litigation see POSNER, *supra* note 20, at 270-76 (supporting fee-shifting to successful defendants and restrictions of treble damages in antitrust suits); William J. Baumol & Janusz A. Ordover, *Use of Antitrust to Subvert Competition,* 28 J.L. & ECON. 247, 250-51 (1985) ("[T]he social costs of rent-seeking protectionism can be very high.").

protected products into the United States.[22] The Court could have reached either decision, and thereby promoted or discouraged price discrimination without imposing much of an administrative burden. Rent-seeking through litigation is more of a problem with antitrust regulation of price discrimination because any rule determining what sort of price discrimination is anticompetitive is likely to be quite uncertain. In contrast, the rule about importation of copyrighted works is relatively certain. Uncertainty about liability encourages opportunistic antitrust suits and possibly chills legitimate pricing decisions by sellers.[23] Concern about administrative costs and rent-seeking pushed the courts to restrict antitrust oversight of vertical restraints.[24] IP law can be used to regulate vertical restraints more extensively because it better avoids these costs.[25]

This Article is structured to discuss six types of vertical restraints: restrictions on the field or location of use; restrictions on sharing; control over the frequency of use; restrictions on repair and modification; packaging requirements; and impediments to a buyer's decision to exit its relationship with a seller. Each part explains how the restraint is regulated by IP law. Where appropriate, the antitrust treatment of the restraint is compared to the IP treatment. Finally, the policy issues presented by each restraint are described. The conclusion compares the effectiveness of IP law and antitrust law as instruments for regulating vertical restraints.

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22. *See* Quality King Distribs., Inc. v. L'anza Research Int'l, Inc., 523 U.S. 135, 152 (1998).

23. *See* Joskow, *supra* note 11, at 98-99. Antitrust policy must send clear signals. It is designed to deter bad behavior—not to "scrutinize, screen, or approve firm behavior or market structures." *Id.* at 98.

24. *See id.* at 98 (arguing that antitrust law should not be used to regulate most market imperfections because of the high transaction costs associated with such "micromanagement"). Measures that control rent-seeking litigation sometimes discourage too much socially desirable litigation. *See also* SULLIVAN & GRIMES, *supra note* 8, at 910-13 (noting benefits of private antitrust enforcement).

25. In contrast to antitrust law, IP law creates a temptation for IP owners to engage in anticompetitive litigation—suits with little merit and the potential to discourage legitimate new competitors. *See* Michael J. Meurer, *Controlling Opportunistic and Anticompetitive Intellectual Property Litigation,* 45 B.C. L. REV. (forthcoming May 2003).

I. TYPE OF USE

In markets protected by IP, sellers often segment their buyers based on line of business, location, field of technology, or whether the use is not-for-profit.[26] They implement this segmentation through contract terms that specify allowable uses. The usual goal of this marketing strategy is price discrimination.[27] Price discrimination occurs when a seller charges different prices to different classes of customers even though the marginal cost of serving the different classes is the same.[28] For example, DuPont imposed a field of use restriction and charged different prices for a patented synthetic fiber depending on the end use intended by the customers.[29] Price discrimination allows the seller to increase profit by tailoring prices to different customer classes that have different preferences.

Whether price discrimination is profitable depends on the cost of sorting customers into appropriate classes and the cost of blocking arbitrage. In this context, arbitrage occurs when a customer in a class that is supposed to pay a high price is able to obtain a product or license at a low price. A common source of arbitrage is the resale market—a favored customer purchases at a low price and resells to a disfavored customer. Arbitrage also occurs when a customer violates a use restriction and the seller fails to stop the violation.

Price discriminating sellers try to block arbitrage by restricting resale and by restricting the type of use allowed by favored customers. Sellers can sue users for breach of contract when they violate license restrictions. Various IP law doctrines

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26. In *ProCD Inc. v. Zeidenberg*, 86 F.3d 1447, 1455 (7th Cir. 1996), the court upheld a consumer use restriction in the face of a copyright preemption claim. *ProCD*, however, is more of a horizontal restraint case than a vertical restraint case. The goal of the lawsuit was to stop reproduction of data after the defendant offered a competing telephone directory on the Internet. *Id.* at 1450.

27. *See generally* S. J. Liebowitz, *Copyright Law, Photocopying, and Price Discrimination*, *in* 8 RESEARCH IN LAW AND ECONOMICS: THE ECONOMICS OF PATENTS AND COPYRIGHTS 181, 182 (John Palmer & Richard O. Zerbe, Jr. eds., 1986) (describing price discrimination in the market for academic journals); Meurer, *Price Discrimination*, *supra* note 13, at 80-90 (describing the pervasive role of copyright law in both facilitating and impeding price discrimination).

28. *See* Michael J. Meurer, *Price Discrimination, Personal Use and Piracy: Copyright Protection of Digital Works*, 45 BUFF. L. REV. 845, 869-71 (1997).

29. *See* Akzo v. United States Int'l Trade Comm'n, 808 F.2d 1471, 1488 (Fed. Cir. 1986).

increase the profitability of price discrimination by further discouraging arbitrage. If the act of arbitrage also violates an IP right, then sellers can bring more potent infringement claims in addition to contract claims against arbitrageurs.[30] Furthermore, the IP claims are available against arbitrageurs who are strangers to the seller, thereby overcoming the privity limitation on contract claims.[31]

IP law generally facilitates restrictions on types of use, but its effect on resale restrictions is mixed—sometimes facilitating and sometimes discouraging resale restrictions. The baseline rule in patent and copyright law gives buyers the right to transfer products that they purchase. IP owners can avoid this rule, called the first sale or exhaustion doctrine, by leasing rather than selling their products.[32]

Resale across national borders is treated distinctly from domestic resale. Copyright provides an importation right but it is limited by the first sale doctrine.[33] The copyright owner can block unauthorized imports, but cannot block authorized copies that are imported back into the United States.[34] This forces a copyright owner to rely on contract law to block arbitrage against geographic price discrimination. Trademark law provides similar treatment of so-called gray market goods.[35] A United States trademark holder may bar the importation of goods bearing the same trademark when manufactured by a foreign manufacturer but cannot stop importation of goods

30. *See* Mallinckrodt, Inc. v. Medipart, Inc., 976 F.2d 700, 709 (Fed. Cir. 1992).

31. *See* Delta & Pine Land Co. v. Sinkers Corp., 177 F.3d 1343, 1347-48 (Fed. Cir. 1999) (discussing requirements for third party liability for sales that violate a PVPA certificate); David Nimmer et al., *The Metamorphosis of Contract into Expand*, 87 CAL. L. REV. 17, 35 (1999) (discussing copyright issues in the context of software copying).

32. *See* Communications Groups Inc. v. Warner Communications, Inc., 527 N.Y.S.2d 341, 344 (N.Y. Civ. Ct. 1998) (characterizing a negotiated software agreement as a lease even though the document described the agreement as a license); Joseph P. Liu, *Owning Digital Copies: Copyright Law and the Incidents of Copy Ownership*, 42 WM. & MARY L. REV. 1245, 1301-02 (2001) (discussing resale and the right of alienation). Resale is not a problem for IP owners who license information rather than sell a product because they can preclude any transfer in the license. *See* Raymond T. Nimmer, *Licensing in the Contemporary Information Economy*, 8 WASH. U. J.L. & POL'Y 99, 119 n.39 (2002) (comparing sales, leases, and licenses).

33. *See* Quality King Distribs., Inc. v. L'anza Research Int'l, Inc., 523 U.S. 135, 138-40 (1998).

34. *See id.* at 145.

35. *See* Kmart Corp. v. Cartier, Inc., 486 U.S. 281, 286-91 (1988).

made under the control of the domestic trademark holder.[36] In contrast, the Patent Act prohibits any importation of a patented product into the United States, and greatly facilitates geographic price discrimination.[37]

Patent law broadly facilitates restrictions on type of use while copyright gives more limited support. A patent owner has the right to exclude others from *use* of a patented invention. The predominant view in patent law states that because the patent owner can exclude all use, the statute gives an implied right to grant permission for some uses and still sue the licensee for infringement if she engages in an unauthorized use.[38] Copyright law enumerates certain uses that are the exclusive right of the copyright owner. Most relevant for this discussion of vertical restraints is the public performance right.[39] This right facilitates price discrimination in the movie and music markets between home users and buyers who want to engage in a public performance, for example, exhibiting a movie in a theater or broadcasting music on the radio.[40]

Compared to IP law, antitrust oversight of price discrimination is relatively passive. Antitrust plaintiffs had some success in the 1960s. In one notable case the owner of a patent on shrimp peeling machinery leased machines to Gulf Coast shrimp companies for half the rental rate that it charged Pacific Coast shrimp companies.[41] The Fifth Circuit found this geographic price discrimination violated section 5 of the FTC Act because it injured competition in the shrimp canning

36. *See id.* at 292. The trend in Europe favors gray markets and opposes the use of intellectual property to facilitate international price discrimination. *See* S.O. Spinks, *Exclusive Dealing, Discrimination, and Discounts Under EC Competition Law*, 67 ANTITRUST L.J. 641, 666-67 (2000).

37. *See* 35 U.S.C. § 271(a) (2002). Section 271(g) also prohibits importation of a product made with a patented process, even if the process was used outside of the United States with permission. *See* Ajinomoto Co. v. Archer-Daniels-Midland Co., 228 F.3d 1338, 1348 (Fed. Cir. 2000), *cert denied*, 532 U.S. 1019 (2001).

38. *See* BOWMAN, *supra* note 6, at 140-42 (arguing that an absolute right to exclude use implies a right to impose any conditions on the use of a patented invention). *But see* Kaplow, *supra* note 2, at 1846 (arguing against this view and claiming it "has gradually fallen into disfavor in the patent-antitrust context"). The implied right is made explicit regarding restrictions on location of use. *See* 35 U.S.C. § 261.

39. 17 U.S.C. § 106(4) (2000) gives music composition copyright owners the right to control public performance of their music.

40. *See* Meurer, *Price Discrimination*, *supra* note 13, at 109-16.

41. *See* Lapeyre v. FTC, 366 F.2d 117, 118 (5th Cir. 1966).

business.[42] Hovenkamp, Janis, and Lemley doubt the case would have come out the same way today.[43] They review recent cases and conclude that antitrust law permits price discrimination in patent licenses, but the sale of patented goods is still governed by the Robinson-Patman Act.[44] The Robinson-Patman Act is also occasionally applied to goods that incorporate copyrighted expression, like books and video cassettes,[45] but it has not had much impact on IP protected markets.[46]

Patent and copyright law permit contract restrictions based on location and type of use, but patent law goes further than copyright law to encourage sellers to impose those restrictions by creating a strong importation right and a broad right to control use of a patented invention. To assess the economic significance of these differences one needs to examine the social welfare effects of these restraints. A common view among antitrust commentators is that sellers segment customer classes to achieve some distributional efficiency.[47] The same argument is pressed by copyright and trademark owners who oppose importation of gray market goods.[48] They argue exclusive territories are established to encourage investment by distributors in local goodwill and service.[49] The empirical evidence suggests, however, that gray markets arise

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42. *Id.* at 121. *But see* HOVENKAMP ET AL., *supra* note 6, § 13.5 (expressing doubt that this case is good law today).

43. *See* HOVENKAMP ET AL., *supra* note 6, § 13.5.

44. *See id.* § 23.4. Courts have rejected claims that price discrimination constitutes a form of misuse. *See, e.g.*, USM Corp. v. SPS Techs., Inc., 694 F.2d 505, 511 (7th Cir. 1982) (holding that a patentee is entitled to use price discrimination to maximize its profit); HOVENKAMP ET AL., *supra* note 6, § 3.3b7.

45. *See* HOVENKAMP ET AL., *supra* note 6, § 13.5.

46. *See* William W. Fisher III, *Property and Contract on the Internet*, 73 CHI.-KENT L. REV 1203, 1255 (1998); Meurer, *supra* note 28, at 871.

47. *See* BOWMAN, *supra* note 6, at 61-62, 64-139 (arguing that use restrictions in patent licenses promote efficiency).

48. In *Quality King Distributors, Inc. v. L'anza Research Int'l, Inc.*, the copyright owner sold shampoo with copyrighted labels on the shampoo bottles. 523 U.S. 135, 138 (1998). The shampoo manufacturer argued that exclusive geographic markets were justified because of the divergent marketing strategies used in the United States and abroad. *Id.* at 138-39.

49. *See* Nancy T. Gallini & Aidan Hollis, *A Contractual Approach to the Gray Market*, 19 INT'L REV. L. & ECON. 1, 4-5 (1999). Such an efficiency justification was raised by the copyright owner in *Quality King*, but it was not very persuasive. 523 U.S. at 138-39, 152.

to arbitrage geographic price discrimination.[50] Thus, the relevant policy issue is whether IP law should encourage geographic, field of use, and similar forms of price discrimination.

IP scholars have developed a recent fascination with the policy effects of price discrimination in IP-protected markets.[51] Some embrace price discrimination because it has the potential to increase profit and the incentive to create, and simultaneously increase output. Others are skeptical because of its distributional implications, or because it may actually cause output to fall.[52] It is possible that patent law's greater solicitude for price discrimination is explained by the perception that the extra profit from price discrimination is especially valuable as an incentive to invent (specifically to invent pharmaceuticals, an industry that practices extensive price discrimination[53]). Perhaps the same incentive argument is not as persuasive in copyright protected markets.

Two other policy considerations are important in shaping optimal IP policy. First, any decision to expand the scope of IP rights increases the social costs associated with opportunistic and anticompetitive IP litigation. Converting a simple contract

50. *See* Gallini & Hollis, *supra* note 49, at 6 (explaining that empirical evidence shows that price discrimination is probably the most important cause of gray market transactions); David A. Malueg & Marius Schwartz, *Parallel Imports, Demand Dispersion, and International Price Discrimination*, 37 J. INT'L ECON. 167, 172-74 (1994) (reviewing empirical evidence and concluding that arbitrage against price discrimination is a significant source of gray market activity).

51. *See* Yochai Benkler, *An Unhurried View of Private Ordering in Information Transactions*, 53 VAND. L. REV. 2063 (2000); James Boyle, *Cruel, Mean, or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property*, 53 VAND. L. REV. 2007 (2000); Julie E. Cohen, *Copyright and the Perfect Curve*, 53 VAND. L. REV. 1799 (2000); Fisher, *supra* note 40; William W. Fisher III, *Reconstructing the Fair Use Doctrine*, 101 HARV. L. REV. 1661, 1742-43 (1988); Wendy J. Gordon, *Intellectual Property as Price Discrimination: Implications for Contract*, 73 CHI.-KENT L. REV. 1367 (1998); F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 727-32 (2001); Glynn S. Lunney, Jr., *Reexamining Copyright's Incentives-Access Paradigm*, 49 VAND. L. REV. 483, 630-34 (1996); Meurer, *Price Discrimination*, *supra* note 13; Meurer, *supra* note 28.

52. *See* Kaplow, *supra* note 2, at 1873-78 (discussing the effect on social welfare of price discrimination by a patent owner).

53. *See* Claude E. Barfield & Mark A. Groombridge, *Parallel Trade in the Pharmaceutical Industry: Implications for Innovation, Consumer Welfare, and Health Policy*, 10 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 185, 194-96 (1999).

claim into a patent or copyright infringement claim gives the IP owner significant strategic advantages because of the threat of preliminary and permanent injunction, fee-shifting, and treble damages for willful infringement.[54] Furthermore, IP rights can be asserted against innocent strangers (perhaps importers) who might be vulnerable to an opportunistic IP suit. These rent-seeking costs need to be balanced against any incentive benefit before IP rights are expanded to support price discrimination.

Second, IP law can channel sellers into choosing a socially beneficial form of price discrimination rather than a socially harmful form.[55] Copyright's public performance right serves this function. If the public performance right were deleted from the statute, music and movie producers would find another, more costly, way to discriminate between buyers intending to publicly perform the work, and buyers intending only private use. One possibility would be a very high initial sales price followed after a significant delay with a lower sales price targeted at home users. Another possibility would be vertical integration into movie exhibition or radio broadcast. The public performance right allows discrimination and avoids the high implementation costs associated with the other strategies.

A related point is that copyright can shape the distributional effects of price discrimination by building exemptions into a right. Section 110 provides various exemptions to the public performance right to promote educational and nonprofit performances,[56] and other exemptions that might be explained by relatively high transaction costs compared to the value of the public performance to the user.[57] Thus, copyright effectively supports price discrimination to the bulk of users intending a public performance, while sheltering certain users to advance various policy goals.

Appropriately, antitrust regulation of type of use restraints is quite limited. Hovenkamp contends that "the costs of preventing price discrimination without any accompanying exclusionary conduct would almost certainly outweigh any benefits, particularly if the market is competitive or

54. *See* Meurer, *supra* note 25.
55. *See* Meurer, *Price Discrimination*, *supra* note 13, at 103-05.
56. *See* 17 U.S.C. § 110 (2000).
57. *See* Meurer, *Price Discrimination*, *supra* note 13, at 114-16.

oligopolistic."[58] The basic difficulty with the Robinson-Patman approach is that it puts courts in an uncomfortable position as price regulators. In contrast, IP law works in the background by encouraging or discouraging arbitrage.[59]

II. LENDING AND PRIVATE REPRODUCTION

Copyright law has been racked by controversies regarding the rights of buyers and sellers with regard to sharing. Even use of the term "sharing" is controversial.[60] I use it to describe various types of coalitions formed by consumers for consumption of copyrighted works. I define sharing as any activity such that a single copy of a work provides utility to a small number of end users in addition to the purchaser. This part addresses two common sources of sharing: lending and private reproduction.[61]

Copyright law displays much ambivalence toward sharing. It would seem that private reproduction runs afoul of the reproduction right specified in § 106(1), but many forms of private reproduction are privileged by statutory exemptions or the fair use defense.[62] It would also seem that buyers are permitted to lend copies that they purchase under the first sale doctrine, but that right is limited by amendments that preclude commercial lending of music and software.[63] Regulation of sharing is further complicated by enforcement problems. Copyright law recognizes the difficulty of enforcement against small scale sharing, and allows copyright owners to sue parties who contribute to copyright infringement by providing reproduction technology or otherwise facilitating illicit sharing.[64]

Library lending is the oldest significant source of sharing. The first sale doctrine gives libraries the right to lend books

58. HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE § 14.5a (2d ed. 1999).

59. One important role is prohibition of territorial or field of use restrictions that promote cartelization. *See* Kaplow, *supra* note 2, at 1879.

60. *See* Michael J. Madison, Sharing and Copyright: Language and Practice (2002) (unpublished manuscript, on file with author).

61. *See* Meurer, Sharing, *supra* note 13.

62. *See* 17 U.S.C. § 107 (2000) (fair use doctrine); *id.* § 108 (library exemption); *id.* § 117 (archival copies of software).

63. *See id.* § 109(b)(1)(A).

64. *See, e.g.*, Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 434-42 (1984).

and other copyrighted material in their collections.[65] But the nature of library sharing may soon change drastically as libraries incorporate more digital content into their collections. The contracts governing the transactions for digital content usually include terms that restrict transfer.[66] The copyright owners argue that the first sale doctrine does not apply to digital transactions because they license rather than sell their products.[67] The Uniform Computer Information Transactions Act and some cases approve of this theory.[68] In other cases, courts characterize the purported licenses as sales and refuse to enforce the resale restrictions.[69]

The music and software industries obtained copyright amendments that bar unauthorized commercial music and software rental.[70] A puzzling contrast in United States copyright law is that commercial video rental is permitted without permission from movie copyright owners.[71] The movie industry was not successful when it lobbied for an amendment comparable to the amendments obtained by the music and software industries.[72] In many other countries, copyright law does give copyright owners control over movie rental.[73]

The introduction of reproduction technology to consumer markets made private reproduction another significant source

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65. *See* 17 U.S.C. § 109(a) (first sale doctrine). Many European countries give the copyright owner a lending right that provides a fee based on the volume of lending activity. *See* Jane C. Ginsburg, *Reproduction of Protected Works for University Research or Teaching*, 39 J. COPYRIGHT SOC'Y 181, 196 (1992) (describing Nordic country photocopy license fees set as a price per page copied, as "a lump sum payment from each user, group" or occasionally as lump sum per inhabitant or per student).

66. Bowman, *supra* note 1.

67. *See* Nimmer, *supra* note 32, at 115-17, 129-32.

68. *Id.*

69. *See* Novell, Inc. v. Network Trade Ctr., Inc., 25 F. Supp. 2d. 1218, 1230-31 (D. Utah 1997) (refusing to enforce shrink-wrap term that purported to limit the first sale doctrine); Microsoft Corp. v. Harmony Computers & Elecs., Inc., 846 F. Supp. 208, 212-13 (E.D.N.Y. 1994) (refusing to apply first sale doctrine to software license); Nimmer et al., *supra* note 31, at 34-40.

70. Recorded music cannot be rented without permission from the copyright owner. *See* Record Rental Amendment of 1984, 17 U.S.C. § 109(b)(1)(A). The Computer Software Rental Amendments Act of 1990 prohibits unauthorized rental of many types of software. *See id.*

71. Robert A. Rosenbloum, *The Rental Rights Directive: A Step in the Right and Wrong Directions*, 15 LOY. L.A. ENT. L.J. 547, 579 (1995).

72. *See* MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 8.12[B][7][a] n.119 (2002); Rosenbloum, *supra* note 71, at 578.

73. *See* Rosenbloum, *supra* note 71, at 551.

of sharing. The photocopier added a new dimension to library-based sharing; now patrons can reproduce a portion of a text in addition to borrowing a text. Much photocopying does not infringe copyright because of the fair use doctrine or because of statutory exemptions for libraries.[74] The fair use doctrine is a multi-factor balancing test that allows copying that achieves certain socially desirable purposes provided the effect on copyright owners' incentives are not too severe.[75] Spontaneous, noncommercial, and academic photocopying tends to be fair.[76] Systematic and commercial photocopying tends to be infringing.[77]

Consumers share music and video by making and exchanging private copies. Such sharing has become routine, but the first important case on the question was hotly disputed and decided by a five to four vote in the Supreme Court. In *Sony Corp. of America v. Universal City Studios, Inc.*, the Court held private copying of television programs may be a fair use.[78] Specifically, it is fair use for consumers to videotape television programs so they can view them at some time after the broadcast.[79] Many other countries initially found such copying was infringing, and then revised their copyright statutes to allow private copying, but they also collect taxes on recording media and devices and give the tax revenue to copyright owners.[80]

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74. Extensive photocopying of medical journals at the National Institutes of Health and the National Library of Medicine was judged to be a fair use in *Williams & Wilkins Co. v. United States*, 487 F.2d 1345 (Ct. Cl. 1973), *aff'd per curiam* 420 U.S. 376 (1975), by an equally divided Court.

75. *See* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 450-51 (1984).

76. *See* Nicole B. Casarez, *Deconstructing the Fair Use Doctrine: The Cost of Personal and Workplace Copying After* American Geophysical Union v. Texaco, Inc., 6 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 641, 653, 657, 705-15 (1996).

77. *See* Am. Geophysical Union v. Texaco, Inc., 60 F.3d 913, 931-32 (2d Cir. 1994).

78. 464 U.S. at 447-56.

79. The Court approved of "time-shifting" as a purpose deserving protection under the fair use doctrine. *Id.* at 454-55. There has been relatively little written by United States courts but a great deal written by law professors that approves of time-shifting and other personal uses as fair use. *See, e.g.*, Deborah Tussey, *From Fan Sites to Filesharing: Personal Use in Cyberspace*, 35 GA. L. REV. 1129, 1181-89 (2001) (advocating a statutory personal use privilege).

80. Generally, European nations have copyright provisions that permit private copying but also impose taxes on copying equipment and media that

The much publicized Napster case indicates some of the limits on personal reproduction rights.[81] The Ninth Circuit found that personal reproduction and exchange of digital music files over an anonymous Internet file-sharing service is not fair use.[82] Additionally, the court ruled that the company Napster was indirectly liable for copyright infringement because it provided software and services that facilitated unlawful file-sharing.[83] In contrast, Sony was not liable for the sale of video recorders.[84] Although video recorders can be used to make unlawful copies, since they are capable of a substantial non-infringing use, there is no contributory infringement.[85]

The antitrust approach to regulation of sharing asks whether vertical restraints on private reproduction and transfer cause anticompetitive effects to distributors or potential competitors in downstream markets. The answer in most of the interesting cases is clearly no, thus there is not much of a role for antitrust.[86] In contrast, economic analysis of

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are paid to copyright owners. *See* Edmund L. Andrews, *Fighting Free Music, Europeans Take Aim at Personal Computers*, N.Y. TIMES, Feb. 14, 2001, at A1 (reporting that many European countries impose copyright fees on audio and videocassette recorders and blank tapes). For example, the taxes collected on blank audiotapes and audio recording equipment are paid to music copyright owners. *See* Eugen Ulmer & Hans Hugo von Rauscher, *Germany (Federal Republic)*, *in* INTERNATIONAL COPYRIGHT AND NEIGHBOURING RIGHTS 422 (Stephen M. Stewart & Hamish Sandison eds., 2d ed. 1989). Germany taxes photocopy machines and each copy by libraries or schools to cover copying losses to copyright owners. *Id.* at 422-23. Spain imposes a tax on equipment and media to pay for private copying. Edward Thompson, *Spain*, *in* INTERNATIONAL COPYRIGHT AND NEIGHBOURING RIGHTS 367 *supra*. Many countries embrace the notion that "personal" use of copyrighted works is outside of the scope of copyright protection. *See* COMPUTER SCI. & TELECOMMS. BD., NAT'L RESEARCH COUNCIL, THE DIGITAL DILEMMA: INTELLECTUAL PROPERTY IN THE INFORMATION AGE 129 (2000).

81. A&M Records, Inc. v. Napster, Inc., 239 F.3d. 1004, 1015-28 (9th Cir. 2001).

82. *Id.* at 1018-19.

83. *Id.* at 1020-24.

84. Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 456 (1984).

85. *Id.*

86. Antitrust does not directly regulate restraints on sharing, but it may have some indirect effect. Companies that facilitate sharing have been targeted with contributory infringement suits and have responded with antitrust claims. *See* John Borland, *Kazaa Strikes Back at Hollywood, Labels*, CNET NEWS.COM Jan. 28, 2003, *at* http://news.com.com/2100-1023-982344.html. The owner of Kazaa, the music file-sharing service, sued members of the music industry for copyright misuse and antitrust violations and is seeking to bar enforcement of their music copyrights. *Id.* The claim is

copyright law asks what pattern of rights relating to sharing maximizes expected total surplus. This question must be answered by copyright law (at least implicitly) because the law must set some pattern of entitlements.

Optimal policy toward sharing tries to satisfy two goals that are often in conflict: provide an appropriate incentive for the creation of copyrighted works and maximize total surplus from dissemination of these products once they are created.[87] A policy that always forbids sharing without permission is probably not optimal. It does have the desirable effect of maximizing the incentive for creation. But a right to share may be socially desirable because the current incentive for creation is too large, or because giving users the right to share causes total surplus to grow significantly relative to the loss of profit-based incentive.[88] Normally, when sharing raises both profit and ex post surplus it is socially desirable and should be encouraged, and similarly, it should be discouraged when it depresses both profit and ex post surplus.[89] When sharing erodes profit and raises ex post surplus the optimal policy is hard to determine, but encouraging sharing is more likely to be socially desirable when the surplus gain is large and the profit loss is small.[90]

The effect of sharing on profit depends to a large extent on

based on the music industry's alleged refusal to provide copy-protected music files for distribution over the Kazaa network. *Id.* The district court judge in the Napster case found evidence that the music industry might have violated the antitrust laws in the market for digital music distribution. *Id.* The Department of Justice is also investigating music industry activities in markets for digital music. *Id.*

87. *Sony*, 464 U.S. at 450-51; Meurer, Sharing, *supra* note 13.

88. The Ninth Circuit in *Universal City Studios, Inc. v. Sony Corp. of Am.*, 659 F.2d 963, 970 (9th Cir. 1981), and the dissent in the Supreme Court decision that reversed the Ninth Circuit, *see* 464 U.S. 417, 475 (1984) (Blackmun, J., dissenting), argued that the fair use doctrine should not apply to reproductive uses of copyrighted works that enable some types of sharing. The majority rejected this view stating that even some unauthorized time-shifting is not infringing and that fair-use requires a balancing of interests which showed that the social benefits outweighed the costs. 464 U.S. at 448, 455.

89. This statement does not hold if current incentives for creation are too large. If so, then it might be socially desirable to reduce profit (and the accompanying incentive to create) even if that also means reducing total surplus. *See* Meurer, *Price Discrimination*, *supra* note 13, at 95-97.

90. Kaplow looks at the ratio of total surplus change to profit change when formulating an optimal patent policy. *See* Kaplow, *supra* note 2, at 1829-39. Fisher follows the same approach when analyzing the fair use doctrine. *See* Fisher, *supra* note 46, at 1706-17.

how sharing affects demand for the copyrighted work. Sharing affects demand by reducing the number of buyers, increasing the valuations that buyers assign to the product, and lowering or avoiding transaction costs. Valuations rise because most buyers value the opportunity to share in addition to the opportunity to consume the product directly.[91] In some cases, sharing opens the market to new users who otherwise would be excluded because of transaction costs. Finally, sharing may either facilitate or impede the seller's effort to sort consumers into separate groups and charge discriminatory prices.[92]

Optimal copyright regulation of sharing must balance the rights of users and sellers. Sellers would be happiest with complete control over sharing. Then, they could authorize lending, private reproduction, and other activities that contribute to sharing if and only if they increased sellers' profit. Buyers, however, should have the right to share without permission when the sellers' profit incentive is misaligned with the social interest in maximizing total surplus. This might occur when users are excluded from a market by high transaction costs,[93] when sharing undermines inefficient price discrimination,[94] or when buyer coalitions exert countervailing market power that offsets seller market power and increases output.[95]

These policy considerations are critical to a proper fair use

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91. In some markets, valuations also rise because of consumption externalities. A consumption externality implies that a buyer's direct utility rises when the number of other consumers using the product rises. *See* Kathleen R. Conner & Richard P. Rumelt, *Software Piracy: An Analysis of Protection Strategies*, 37 MGMT. SCI. 125, 133, 136 (1991) (noting that sharing may increase profit because of network effects); Lisa Takeyama, *The Welfare Implications of Unauthorized Reproduction of Intellectual Property in the Presence of Demand Network Externalities*, 62 J. INDUS. ECON. 155, 158-62 (1994) (arguing that sharing may increase profit due to high-valuation customers).

92. A subtler but equally important concern is the impact of sharing on the dispersion of buyers' valuations. Increasing dispersion tends to increase inefficiency. Sharing sometimes makes the valuations of potential buyers more homogenous and smoothes demand; other times it increases heterogeneity and the dispersion of demand. *See* Yannis Bakos et al., *Shared Information Goods*, 42 J.L. & ECON. 117, 127-32 (1999). Sharing might also be an efficient method of distributing a good. *See* Janusz A. Ordover & Robert D. Willig, *On the Optimal Provision of Journals Qua Sometimes Shared Goods*, 68 AM. ECON. REV. 324, 325 (1978).

93. *See* Gordon, *supra* note 51, at 1387.

94. *See* Meurer, *Price Discrimination, supra* note 13, at 12.

95. *See* Meurer, Sharing, *supra* note 13, at 21-22.

analysis of sharing. Fair use balances four factors: purpose; nature of the work; amount of the work used; and market effect.[96] Fair use addresses the impact of sharing on incentives for creation through the second and fourth factors. Courts evaluate the nature of a work to see whether it requires strong incentives for creation,[97] and the market effect to identify the impact of sharing on profit.[98] Together these factors lead to a judgment about the impact of sharing on incentives to create. Fair use addresses the impact of sharing on ex post total surplus through the first factor. For example, courts recognize that private copying can be justified as a way to avoid transaction costs.[99] Courts have not considered whether disruption of inefficient price discrimination or creation of countervailing market power are purposes favoring fair use—but the open-ended nature of the balancing test would permit this sort of analysis.

III. FREQUENCY OF USE

Sellers are motivated to control frequency of use because it aids price discrimination.[100] Buyers who use a product more frequently are likely to have a higher valuation and be willing to pay more. Ideally a seller would just ask prospective buyers how frequently they plan to use a product, and then charge more to high frequency users. Of course, buyers may not know the answer to that question at the time of purchase, and they have an incentive to understate their planned usage.[101] Thus, IP owners employ several different strategies to monitor and control frequency of use.

One approach is to control frequency of use directly through contract. A seller could specify an increasing schedule of prices associated with an increasing frequency of permissible use.[102] Contractual use restrictions are difficult to enforce

96. *See* 17 U.S.C. § 107 (2000) (fair use doctrine).

97. *See* NIMMER & NIMMER, *supra* note 72, § 13.05[A][2][a].

98. *Id.* § 13.05[A][4].

99. *Id.* § 13.05[E][3][c][iii].

100. *See* JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 146-48 (1988).

101. *Id.* at 143 (noting the incentive compatibility problem).

102. Digital technology makes this possible for digital content, and it is possible this marketing approach will become common in the not too distant future. *See* Tom W. Bell, *Fair Use vs. Fared Use: The Impact of Automated Rights Management on Copyright's Fair Use Doctrine*, 76 N.C. L. REV. 557, 565-67 (1998); Meurer, *supra* note 28, at 878-79. One attempt with digital

because it is difficult to detect violations.[103] IP law bolsters frequency of use restrictions by adding infringement claims and strong IP remedies to the breach of contract claims.[104] Infringement claims are well grounded in patent law because the patent owner has broad control over use.[105] Copyright law does not offer a comparably broad use right[106] but in some important settings unauthorized use is infringing. Computers (and other consumer electronic devices) usually make a temporary copy of digital content or software during use. Even though temporary, such a copy may be infringing.[107] Thus, a digital copyright owner can sue a buyer who violates a frequency of use restriction for breach of contract, and also for copyright infringement because of the unauthorized temporary reproductions. Copyright law imposes two important limits on these infringement claims. Section 117 gives software owners the right to make copies as an essential step in using a program,[108] and the copyright misuse doctrine might prevent a seller from circumventing the first sale doctrine.[109]

More commonly, sellers control frequency of use indirectly through the sale of some complementary product that is used

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video failed to win consumer acceptance. *See* Joel Brinkley, *Few Tears are Shed as Divx Joins the 8-Track*, N.Y. TIMES, June 24, 1999, at G6.

103. *See* Keith N. Hylton, *Economic Rents and Essential Facilities*, 1991 BYU L. REV. 1243, 1260-61 (1991).

104. *See, e.g.*, Mallinckrodt, Inc. v. Medipart, Inc., 976 F.2d 700, 709 (Fed. Cir. 1992) (ruling that violation of the single use requirement was patent infringement as well as contract breach).

105. *See* BOWMAN, *supra* note 6, at 142-46 (reading exhaustion cases to permit patent restrictions on use after sale as long as the restrictions are explicit).

106. Rights under copyright law are limited to the reproduction, adaptation, distribution, performance, and display rights confined in § 106. *See* 17 U.S.C. § 106 (2000).

107. *See* MAI Systems Corp. v. Peak Computer, Inc., 991 F.2d 511, 518-19 (9th Cir. 1993) (holding that the copy of software created in RAM (random access memory) during execution is sufficiently fixed to qualify for copyright protection).

108. 17 U.S.C. § 117. The *MAI* court held that a licensee is not an owner so § 117 did not apply. *See* 991 F.2d at 517. Courts often reject this approach for mass-market software. *See supra* note 69 and accompanying text.

109. *See* Brett Frischmann & Dan Moylan, *The Evolving Common Law Doctrine of Copyright Misuse: A Unified Theory and Its Application to Software*, 15 BERKELEY TECH. L.J. 865, 874-75 (2000); *cf.* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 32 (2001) (the exhaustion and implied license doctrines are meaningless in the software context if making a RAM copy or other temporary copy amounts to an infringing "making").

with the IP protected product. Sellers require buyers to purchase the complementary product (1) through a tying contract, (2) because of product design, or (3) by threat of an infringement suit against a competing supplier. The classic illustration of contractual tying and price discrimination comes from the antitrust tying case *IBM Corp. v. United States*.[110] IBM leased patented tabulator machines on the condition that the lessee purchase all of the punch cards needed for use in the machines from IBM.[111] Punch card purchases measured frequency of use. Rather than charging a rental rate that varied directly with frequency of use, IBM charged a premium over the competitive price for punch cards, and thereby indirectly collected a rental rate that increased with the frequency of use.[112] IBM could have implemented essentially the same pricing scheme by installing a counter on each machine that recorded the number of cards processed, or by requiring lessees to record and report how many cards they used (or some other measure of frequency of use). No doubt they chose the punch card tie because it was less costly and more reliable.[113]

Antitrust law treats tying contracts as per se illegal, but actually imposes a relatively mild check. A tying contract is unlawful if there are truly separate tied and tying products, the seller has market power in the tying product market, and there are anticompetitive effects in the tied product market.[114] Older cases like *IBM* found ties that appear to implement price discrimination to be unlawful,[115] but recent courts have been quite tolerant. "[T]he great majority of decisions conclude that the simple fact that a tie causes price discrimination is not

110. 298 U.S. 131 (1936).

111. *Id.* at 134.

112. *Id.* at 139. The same type of price discrimination was practiced in *Motion Picture Patents Co. v. Universal Film Mfg.*, 243 U.S. 502 (1917). Movie projectors were tied to film, and the patent owner derived most of its profit from the sale of film. *Id.* at 506-07.

113. A similar fact pattern was described in *Morton Salt Co. v. G.S. Suppiger Co.*, 314 U.S. 488, 489-90 (1942). The lease of a patented canning machine was tied to the sale of salt tablets. *Id.* Salt sales meter intensity of use of the canning machine. *Id.* Perhaps the lessor wanted to control the salt used in the leased machines to prevent harm caused by inferior salt.

114. The plaintiff must also show evidence of actual coercion that forced the buyer to accept the tie, and that the tied product market involves interstate commerce. *See* HOVENKAMP, *supra* note 58, § 10.1.

115. *See IBM*, 298 U.S. at 140.

sufficient for illegality."[116] The patent and copyright misuse doctrines evaluate tying claims essentially the same way as antitrust law.[117]

Sellers can use product design to implement a technological rather than a contractual tie. This approach works when the seller offers a system containing two components that interact through an interface that the seller designs so it is difficult for a third party to make a compatible tied product. The tied component is consumed by users and must be replaced frequently. The seller monitors frequency of use through sales of the consumable component. For example, a medical device manufacturer named Bard apparently used the sale of biopsy needles to measure the frequency of use of a gun that inserted the needles.[118] Bard violated § 2 of the Sherman Act by changing the interface between the gun and the needles to exclude other needle manufacturers.[119] Section 2 oversight is significantly limited by the requirement that the defendant possess monopoly power,[120] and by antitrust courts' reluctance to meddle with innovation.[121]

IP law regulates the development and creation of product interfaces and thereby facilitates or discourages product design based tying. Patent and trade secret law protect product interfaces. A seller can block all use of a patented interface,

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116. *See* HOVENKAMP ET AL., *supra* note 6, § 21.2e.

117. *See Morton Salt Co.*, 314 U.S. at 493 (attempting to block enforcement of the patent by alleged infringer's invocation of the doctrine of patent misuse); HOVENKAMP ET AL., *supra* note 6, § 3.1 (noting that antitrust and patent misuse are closely linked). Patent misuse is not the same as the equitable doctrine of unclean hands for two reasons: The patentee loses both injunctive remedies and damages and the whole patent is unenforceable against any infringer. The Federal Circuit established three categories that apply to misuse analysis. *See* Virginia Panel Corp. v. MAC Panel Corp., 133 F.3d 860, 869 (Fed. Cir. 1997). Certain restraints (tying and extending the patent term) are per se misuse. Other restraints are per se legal under § 271(d). Restraints that do not fall into the first two categories either do not broaden "the scope of the patent claims and thus cannot constitute patent misuse," or do broaden the scope of the patent claims and may constitute misuse if they have an anticompetitive effect under a rule of reason analysis. *Id.*

118. *See* C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1382-83 (Fed. Cir. 1998) (noting that Bard excluded competitors from the market for replacement needles).

119. *Id.*

120. *See* Telex Corp. v. IBM Corp., 510 F.2d 894, 919 (10th Cir. 1975).

121. *See, e.g.*, Berkey Photo v. Eastman Kodak Co., 603 F.2d 263 (2d Cir. 1979); *Telex Corp.*, 510 F.2d at 933. *But see* C.R. Bard Inc. v. M3 Systems, 157 F.3d 1340, 1382 (Fed. Cir. 1998).

but reverse engineering is allowed if the interface is protected as a trade secret.[122] Reverse engineering of software interfaces requires making a copy of the interface software. Sellers have tried to use copyright law to block the reverse engineering, but courts have denied infringement claims under the fair use doctrine.[123] Finally, sellers have had mixed success with contracts that precluded reverse engineering.[124]

Another, more doubtful, strategy for protecting a product interface is a claim based on section 1201(a) of the Digital Millennium Copyright Act (DMCA). That section creates a right prohibiting circumvention of means that control access to copyrighted works.[125] Recently, a printer manufacturer filed a lawsuit in which it seeks to use the DMCA to control the market for replacement ink cartridges.[126] The claim has some plausibility because the software incorporated in the interface is copyrightable subject matter, but there is a strong argument that the lawsuit improperly extends the scope of copyright to the market for replacement ink cartridges and therefore violates the misuse doctrine or antitrust law.[127]

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122. *See Telex Corp.*, 510 F.2d at 933 (noting that trade secret law protects interfaces).

123. The leading case is *Sega Enter. Ltd. v. Accolade, Inc.*, 977 F.2d 1510 (9th Cir. 1992). Plaintiff Sega makes and sells the Genesis console and video game cartridges. *Id.* at 1514. Accolade makes game cartridges that run on different types of consoles. *Id.* Sega licenses independent game makers but did not license Accolade. *Id.* Accolade reverse engineered the Sega video game programs to discover the requirements for compatibility and then made compatible game cartridges. *Id.* The court held that copying and disassembly to discover functional compatibility requirements constitutes a fair use. *Id.* at 1521.

124. *See* Bowers v. Baystate Techs., Inc., 302 F.3d 1334, 1344 (Fed. Cir. 2002); DSC Communications Corp. v. DGI Techs., 81 F.3d 597, 601 (5th Cir. 1996); Lasercomb Am., Inc. v. Reynolds, 911 F.2d 970, 971-72 (4th Cir. 1990). In *Vault Corp. v. Quaid Software Ltd.*, 847 F.2d 255, 261 (5th Cir. 1988), the court applied § 117(1) to reverse engineering. In other cases, courts have read § 117 to apply only to temporary copies associated with approved uses of the software. Cohen & Lemley, *supra* note 109, at 33 (arguing that the exhaustion doctrine should preempt license term that precludes reverse engineering); *id* at 35-36 (contending that patent misuse should apply to attempts to prevent reverse engineering in software license).

125. 17 U.S.C. § 1201(a) (2000).

126. Brief of Amicus Curiae Law Professors at 6, Lexmark, Int'l Inc. v. Static Control Components, Inc., (E.D. Ky 2003) (No. 02-571-KSF); David Becker, *Lexmark Wins Injunction in DMCA Case,* CNET NEWS.COM, Feb. 27, 2003, (noting that preliminary injunction was granted) *at* http://news.com.com/2100-1028-990501.html?tag=fd_top.

127. *See* Dan L. Burk, *Anti-Circumvention Misuse*, 48 UCLA L. Rev. (forthcoming 2003), *available at* http://papers.ssrn.com/sol3/papers.cfm?

The final approach to controlling frequency of use relies on the threat of IP suits against competing suppliers of the tied product. An example in copyright law is presented in *MAI Systems Corp. v. Peak Computer, Inc.*[128] MAI sold computers containing their copyrighted operating system.[129] They tied maintenance service to the computer by suing Peak, a third party maintenance provider, for copyright infringement.[130] The infringement claim was based on the temporary copy that was made when Peak technicians turned on an MAI computer and the operating system was loaded into RAM.[131] An amendment to the Copyright Act partially overruled this case by adding § 117(c), which allows a software owner or lessee to authorize a RAM copy for the purpose of hardware maintenance or repair.[132]

Patent law facilitates ties by allowing contributory infringement suits against competing suppliers of a tied product.[133] For example, Rohm & Haas owned a patent on a method for using an unpatented chemical named propanil as a herbicide.[134] The company effectively tied the sale of propanil to a license to practice the method by refusing to license any farmer who obtained propanil from another source.[135] Rohm & Haas sued a competing manufacturer of propanil for

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abstract _id=320961 (calling for anti-circumvention misuse doctrine comparable to patent and copyright misuse); Jonathan B. Cox, *Static Control Fights Against Lexmark,* NEWS & OBSERVER, *available at* http://newsobserver.com/business/story/2281215p-2146345c.html (March 4, 2003) (noting that an ink cartridge manufacturer filed antitrust counterclaim against printer manufacturer).

128. 991 F.2d 511 (9th Cir. 1993).

129. *Id.* at 513.

130. *Id.* at 517. The demand for software maintenance, like frequency of use, is probably correlated with the value of the hardware to the customer. Price discrimination is achieved by charging more to customers who need a lot of maintenance, and presumably they are high frequency and high value customers. *See* Meurer, *Price Discrimination, supra* note 13, at 88.

131. *See MAI Systems Corp.*, 991 F.2d at 517-20.

132. 17 U.S.C. § 117 (2000). The new provision does not apply to software maintenance.

133. Patent law once was hostile to such ties but today promotes the use of ties to combat contributory infringement. The hostility peaked in the 1940s with cases like *Mercoid Corp. v. Mid-Continent Inv. Co.*, 320 U.S. 661 (1944), and *Mercoid Corp. v. Minneapolis-Honeywell Regulator Co.*, 320 U.S. 680 (1944). Recent cases have been quite tolerant. *See* Dawson Chem. v. Rohm & Haas Co., 448 U.S. 176, 199-215 (1980).

134. *See Dawson Chem.*, 448 U.S. at 185.

135. *See id.* at 186.

contributory infringement. The paramount question was whether the tie was justified as a means of controlling contributory infringement, or instead was a misuse of the patent which would have made the patent unenforceable. Section 271(c) specifies that a person is liable for contributory infringement if they sell a component of a patented machine, or a material for use in practicing a patented process.[136] A critical element of a contributory infringement claim is a showing that the defendant's product is a non-staple, that is, not suitable for substantial non-infringing use.[137] Propanil was a non-staple since it had no use except to practice the patented method.[138] Ties that serve to deter contributory infringement fall into a safe harbor created in § 271(d) which assures that such a tie is not misuse.[139] Applying § 271(c) and (d) the Court found Dawson Chemical's sale of propanil was contributory patent infringement and there was no patent misuse.[140]

The diverse marketing practices discussed in this Part are linked by the notion that they can all be used to implement price discrimination based on frequency of use.[141] Many of the

136. 35 U.S.C. § 271(c) (2000). If there is no underlying infringement, then there can be no contributory infringement. *See* Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336, 341-42 (1961). Also, the defendant must have knowledge of the patent infringement not just knowledge of the sort of use that end users engage in. Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 488-93 (1964).

137. 35 U.S.C. § 271(c).

138. *See Dawson Chem.*, 448 U.S. at 185-86.

139. 35 U.S.C. § 271(d). If the tie is not designed to enforce rights against contributory infringement, then it is judged by normal misuse standards which mirror antitrust standards applied to ties. *See* Virginia Panel Corp. v. MAC Panel Co., 133 F.3d 860, 869 (1997); HOVENKAMP ET AL., *supra* note 6, § 3.3.b.1.

140. *See Dawson Chem.*, 448 U.S. at 218-23.

141. The restraints discussed in this part have many other possible uses. Tying arrangements promote efficiency in a variety of ways. They serve a quality control function. *See* HOVENKAMP ET AL., *supra* note 6, § 21.2a. Information about frequency of use helps a lessor properly maintain leased equipment. *Id.* § 21.2e. Usage charges help diffuse something economists call the "adverse selection problem." *See* TIROLE, *supra* note 100, at 109. A potential user who is unsure about the value of a new technology can be reassured by an arrangement that requires payment only if he actually uses the product. HOVENKAMP ET AL., *supra* note 6, § 21.2e. Further, strong IP protection of design interfaces allows the producer of the tying product to license competing manufacturers of the tied product and maintain control over the price of the tied product in order to mitigate pricing externalities facing tied product suppliers. *See* Douglas Lichtman, *Property Rights in Emerging Platform Technologies*, 29 J. LEGAL STUD. 615, 616-20 (2000).

Tying arrangements also pose risks of anticompetitive harm. The main

normative issues raised in the context of type of use restrictions and price discrimination apply here. For example, the output effect of usage based pricing can be positive or negative. Output based pricing tends to draw new customers into a market, specifically, customers who are infrequent users who are attracted by the relatively low price charged for infrequent use. Consumption tends to fall among current customers who formerly consumed as much as they wanted, and now face a positive price for each additional use.[142]

An important and difficult policy issue concerns coordination of antitrust and IP law to channel frequency of use pricing toward socially advantageous implementation methods.[143] Some methods are prohibited by antitrust and misuse law.[144] Sellers committed to usage based pricing will choose the most profitable of the permissible methods; their choice will depend on the way IP law affects the cost of various methods. IP encourages product design ties by protecting interfaces with patents, trade secret law, and anti-circumvention law. It discourages design ties by treating reverse engineering as lawful under copyright and trade secret law.[145] Patent law encourages ties involving non-staples and

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hazards are foreclosure and promotion of collusion. *See* HOVENKAMP ET AL., *supra* note 6, § 21.3c-d. The law governing product compatibility and reverse engineering should attend closely to anticompetitive hazards. *See* Pamela Samuelson, *Fair Use for Computer Programs and Other Copyrightable Works in Digital Form: The Implications of* Sony, Galoob *and* Sega, 1 J. INTELL. PROP. L. 49, 86-98 (1993). Copyright protection should be limited so copyright holders cannot expand their copyright software protection to related markets. Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, 111 YALE L.J. 1575, 1588-90 (2002) (evaluating the social welfare effect of reverse engineering in terms of incentive to innovate, incentive for follow-on innovation, price, and wasted cost).

142. *See* Meurer, *Price Discrimination*, *supra* note 13, at 125-26.

143. An interesting question is whether the law should encourage IP owners to choose software interfaces to implement metering, because it is cheaper than using physical interfaces.

144. Antitrust law regulates contractual tying more closely than technological tying. *See* HOVENKAMP ET AL., *supra* note 6, § 21.5b2 (noting that most ties cannot be challenged under section 1 of the Sherman Act, or section 3 of the Clayton Act, and they are difficult to invalidate under section 2 of the Sherman Act).

145. There is a conflict between the circuits regarding contracts that prohibit reverse engineering. The Fifth Circuit preempted a term that prohibited reverse engineering under the copyright statute. *See* Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 270 (5th Cir. 1988). The Federal Circuit, however, refused to apply preemption in a similar setting. *See* Bowers v. Baystate Techs., 302 F.3d 1344, 1348-51 (Fed. Cir. 2003).

copyright law encourages direct frequency of use pricing by making temporary digital copies infringing.[146]

The appropriate scope of the contributory infringement doctrine is another crucial policy issue facing IP law.[147] Liability attaches to defendants who sell a product or component that is not capable of a substantial non-infringing use. The scope of the doctrine can be adjusted by narrow or broad interpretation of the terms *capable of* and *substantial*.[148] Broader scope encourages usage based pricing, makes enforcement easier, and increases the value of a patent or copyright. Narrower scope encourages sale of the defendant's product, and reduces rent-seeking IP litigation. The contributory infringement doctrine provides a social benefit by reducing enforcement costs. A process patent, like the one in *Dawson Chemical*, is difficult to enforce when practice of the process is easy to hide.[149] Patent law eases the enforcement burden for processes that consume a non-staple input (like propanil) because sales of the input are difficult to hide and can be targeted for enforcement action by the patent owner.[150] The doctrine needs to be limited in order to prevent over-rewarding patentees and shifting too much of the cost of enforcement to

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146. *See supra* text accompanying notes 130-42.

147. *See* Hodosh v. Block Drug Co., 833 F.2d 1575, 1578 (Fed. Cir. 1987) (defining non-staple in patent law); Stacey L. Dogan, *Is Napster a VCR? The Implications of* Sony *for Napster and Other Internet Technologies*, 52 HASTINGS L.J. 939, 940 (2001).

> [W]e have little idea of what the copyright staple article of commerce doctrine means. Neither the Supreme Court nor subsequent lower court decisions have elucidated what kinds of products or services can qualify as staple articles of commerce, nor have they provided a framework for deciding whether such an article has a substantial non-infringing use.

Id.

148. *See* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 434-42 (1984). The term *substantial* is not clearly defined, but apparently it means something less stringent than a requirement that the majority of uses are non-infringing. *Id.* at 490-92 (Blackmun, J., dissenting). Further, the phrase *capable of* indicates that future non-infringing uses are sufficient to escape liability. *See* A & M Records, Inc. v. Napster, Inc., 239 F.3d 1004, 1021 (9th Cir. 2001).

149. *See* Dawson Chem. v. Rohm & Haas Co., 448 U.S. 176, 188 (1980); Michael A. Shimokaji, *Inducement and Contributory Infringement Theories to Regulate Pre-Patent Issuance Activity*, 37 IDEA 571, 586 (1997).

150. Additional enforcement benefits arise because the patent owner can reduce the number of suits required for effective enforcement and because the smaller profit from suing direct infringers sometimes makes those suits unprofitable.

third parties.[151] An overly broad doctrine also creates the danger that the seller of a staple product could be exploited through an opportunistic patent or copyright suit.[152]

IV. REPAIR AND MODIFICATION

It is not unusual in IP protected markets for sellers to make strategic decisions about the durability of their products. Naturally, they make product design decisions that affect product durability, but sellers also use vertical restraints to control the economic life of a product. Specifically, they can use contract and IP law to restrict or prohibit user repair or modification—the effect of these restrictions is to stop users from extending the economic life of their products. These restrictions can be profitable in three different ways. First, they help the seller control frequency of use and implement price discrimination. Second, they help the seller suppress the second-hand market. And third, they help the seller maintain a monopoly sales price.

The previous Part explained that sellers often use the sale of a tied product to measure the frequency of use of a tying product. Buyers can thwart this strategy by reusing the tied product. Sellers can respond by making it difficult to reuse the tied product. Such a struggle apparently is taking place in the printer market.[153] Printer companies tie the sale of ink cartridges to printers because cartridge sales are a good

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151. *See* C.R. Bard, Inc. v. Advanced Cardiovascular Systems, Inc., 911 F.2d 670, 675 (Fed. Cir. 1990). When an item that is sold to the public might have non-infringing as well as infringing uses, "the public interest in access to that article of commerce is necessarily implicated." *Id.* (citing *Sony Am. Corp.*, 464 U.S. at 440); *see also* Dogan, *supra* note 147, at 942 (advocating an approach that focuses on consumer access to markets outside the scope of the copyright). *But see* BOWMAN, *supra* note 6, at 146-49, 153-54 (approving cases finding that divisibility of the right to control use implies that tying a staple article of commerce to a patent license is acceptable). When enforcement costs are shifted from IP owners to third parties they might act as a tax on socially valuable new technology that incidentally facilitates IP infringement. *See* Dan L. Burk, *Muddy Rules for Cyberspace*, 21 CARDOZO L. REV. 121, 176 (1999) (suggesting that the law makes us careful not to discourage technological progress).

152. *See* Meurer, *supra* note 25, at 5.

153. *See* Hewlett-Packard v. Repeat-O-Type Stencil, 123 F.3d 1445, 1446 (Fed. Cir. 1997); Becker, *supra* note 126 ("Printer makers have employed a variety of technological means in recent years to undercut the market for recycled toner and ink cartridges, which typically sell for much less than original items. Most printer makers sell their printers at or near cost, making their profit from sales of supplies.").

measure of frequency of use. Printer companies have discouraged third party cartridge suppliers by making it difficult to design a compatible cartridge and by enforcing copyright and patent rights.[154] Buyers responded by simply refilling empty cartridges with ink. Hewlett Packard countered by designing cartridges to be non-refillable.[155] A company named Repeat-O-Type Stencil purchased HP ink cartridges, modified them so that they could be refilled, and sold them to the public.[156] HP sued Repeat-O-Type for patent infringement.[157] The Federal Circuit ruled against HP and held the modification was not infringing.[158]

Sellers also limit reuse of a product outside the tying context. Medical device makers often limit buyers to a single use of a product even though the product could be refurbished and reused.[159] The most likely rationale is to discourage the development of a second-hand market.[160] *Mallinckrodt Inc. v. Medipart Inc.*[161] featured a patented medical device used to deliver mist to the lungs of patients.[162] The patent owner marked the device: "For Single Use Only."[163] The defendant salvaged used devices, sterilized the main parts and resold them.[164] The court treated the label as a valid contract term and enforced the restriction despite an objection that the restriction violated the exhaustion doctrine.[165]

Even if a patent owner fails to impose a contractual restraint on reuse, it can still prohibit certain kinds of reuse that are characterized as infringing reconstruction. In *Cotton-*

154. *See Hewlett-Packard*, 123 F.3d at 1448-50 (listing patent and trademark infringement claims); Brief of Amicus Curiae Law Professors at 6, Lexmark, Int'l Inc. v. Static Control Components, Inc., (E.D. Ky 2003) (No. 02-571-KSF).

155. *See Hewlett-Packard*, 123 F.3d at 1448.

156. *Id.* at 1484.

157. *Id.* at 1449.

158. *Id.* at 1454-55.

159. *See, e.g.*, Karl Storz Endoscopy-America Inc. v. Surgical Techs. Inc., 285 F.3d 848, 856-57 (9th Cir. 2002) (reversing summary judgment for defendant because reconstruction of medical device might constitute trademark infringement).

160. *See id.* at 852-53. This restriction could also be valuable to the seller as a way to monitor frequency of use.

161. 976 F.2d 700 (Fed. Cir. 1992).

162. *Id.* at 701.

163. *Id.* at 702.

164. *Id.*

165. *Id.* at 709.

Tie Co. v. Simmons[166] the patent owner sold patented metal bands used to tie bales of cotton.[167] When the cotton bales arrived at the cotton mill the bands were cut.[168] The defendant collected and recycled the bands.[169] The Court held this was infringing reconstruction.[170]

When courts want to limit the patent owner's control over reuse they characterize a defendant's actions as repair rather than reconstruction.[171] *Kendall Co. v. Progressive Medical Tech., Inc.*[172] illustrates noninfringing repair. The patent covered a medical device that creates pressure used to treat and prevent deep vein thrombosis.[173] The invention comprises a pump, tube, and pressure sleeve.[174] The pressure sleeve is marked: "For Single Use Only."[175] The defendant made and sold replacement sleeves.[176] The combination of the old tube and pump with the replacement sleeves was not reconstruction of the invention, rather it was noninfringing repair.[177]

Sellers restrict repair of some patented devices even when tying and second-hand markets are not present. Such restrictions may be necessary to support a high sale price that is predicated on the belief that consumers will return to purchase a replacement from the patent owner when the device they currently own reaches an optimal retirement age. Ideally, a seller should encourage users to properly maintain a device to prolong its life, and discourage inefficient repairs and modifications. A buyer might practice inefficient repair because the seller uses its market power to set the replacement price above the cost of the replacement.[178] This theory justifies

166. 106 U.S. 89 (1882).

167. *See id.* at 89.

168. *Id.* at 91.

169. *See id.*

170. *Id.* at 95.

171. Mark D. Janis, *A Tale of the Apocryphal Axe: Repair, Reconstruction, and the Implied License in Intellectual Property Law*, 58 MD. L. REV. 423, 424-25 (1999).

172. 85 F.3d 1570 (Fed. Cir. 1996).

173. *Id.* at 1571.

174. *Id.*

175. *Id.* at 1572.

176. *Id.*

177. *See id.* at 1574-76.

178. Let me illustrate this result with an example. Suppose that there are six years remaining in the term of the patent that protects a durable good, and suppose there is no discounting of future costs and benefits. The good provides a benefit of $5 for each year of use. It costs $4 to make a new good, and the

certain contractual restrictions on repair and also the practice of characterizing certain activities as infringing reconstruction even though that might easily be characterized as repair instead.[179]

In *Sandvik Aktiebolag v. E.J. Co.*,[180] the defendant placed new tips on drill bits covered by plaintiff's drill patent. Even though the drill tip was not separately patented, the court ruled this was infringing reconstruction.[181] The court distinguished and permitted users to sharpen the tip when it becomes dull.[182] The court emphasized that sharpening a dull tip is a routine practice, but replacing a tip is difficult and

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good lasts for two years if it is not repaired. The user can repair the good at a cost of $3 and extend its life by one year, so a repaired good lasts a total of three years. In this setting, repair is inefficient because it costs $3 to get a year of service from a good through repair, but only $4/$2 = $2 to get a year of service from manufacture of a new good. If the user is not allowed to repair the good, then the patent owner will charge $10 for the good, and a user would make three purchases over the remaining six years of the patent. The patent owner would earn a profit of $10 - $4 = $6 on each sale for a total profit of $18 from each user.

If the user is allowed to repair the good, then the seller will earn a smaller total profit, and the user will engage in inefficient repair. At the previous price of $10, a user would only make two purchases instead of three over the remaining patent term. The user would repair the good at the end of the second year by paying the repair cost of $4. By making repairs, the user limits her total costs over the six years to $2($10) + $2($3) = $26, the cost of two purchases and two repairs. This is smaller than the cost of three purchases, and it delivers the same benefit. If the patent owner charged a price of $10 it would get a profit from each user of $12 not $18, because it would make two sales not three. The patent owner actually maximizes its profit by raising the price to $12. Users make two purchases and perform two repairs. The patent owner earns a profit of $12 - $4 = $8 on each sale for a total profit of $16 from each user. If the patent owner wanted to induce users to make three purchases and forego inefficient repair, it would have to cut the price to $6. The patent owner, however, would not choose such a low price because it gives a profit of only $6 - $4 = $2 on each sale for a total profit of $6 from each user.

179. *Compare* Sandvik Aktiebolag v. E.J. Co., 121 F.3d 669, 674 (Fed. Cir. 1997) (finding that the replacement of drill tip is infringing), *with* Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336, 346 (1961) (finding that the replacement of fabric in patented roof for convertible car is not infringing).

Reconstruction occurs when a spent article is made new. Relevant factors include: whether some component has a shorter useful life than the article as a whole; how the article is designed; the existence of a market to make or service a part; and the nature of the defendant's actions. *See Sandvik*, 121 F.3d at 673.

180. 121 F.3d 669 (Fed. Cir. 1997).

181. *Id.* at 674.

182. *Id.*

expensive.[183] Users only place a new tip on a drill when it is no longer possible to sharpen the old tip properly. This distinction makes economic sense if the savings that results from deferring the manufacture of a new drill are smaller than the cost of replacing a tip and larger than the cost of sharpening a tip.[184]

Software publishers often prohibit software modification. This vertical restraint prevents users from extending the economic life of the software and may have a similar effect to restraints on the repair of patented products.[185] Some users modify software so they can add new features or move it to a new platform.[186] The seller might prefer the user buy a new version of the software rather than modify an old version. The adaptation right in copyright law applies to software modifications and makes them infringing,[187] but the right is significantly constrained by § 117[188] and the fair use doctrine.[189] Despite these limitations on the adaptation right,

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183. *Id.* at 673.

184. This approach could reach similar outcomes to the approach proposed by Janis. He recommends that the reasonable expectations of the parties should guide the characterization of an activity as repair or reconstruction. *See* Janis, *supra* note 171, at 428, 485. The approaches coincide if the parties expectations are simply that repair will be undertaken if and only if it is efficient.

185. *See* Meurer, *Price Discrimination*, *supra* note 13, at 86; *cf.* CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY 193 (1999) (discussing strategy used for software upgrades).

186. *See* Meurer, *Price Discrimination*, *supra* note 13, at 86.

187. *See* Micro Star v. Formgen Inc., 154 F.3d 1107, 1110-12 (9th Cir. 1998); Midway Mfg. Co. v. Artic Int'l Inc., 704 F.2d 1009, 1013 (7th Cir. 1983), *cert. denied*, 464 U.S. 923 (1983).

188. *See* 17 U.S.C. § 117(a) (2000) (allowing adaptation required as an essential step in use of a computer program or adaptation for archival purposes); Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 270 (5th Cir. 1988) (holding an act which allows sellers to prohibit adaptation rights of software conflicts with the rights of users under § 117 and is federally preempted); Pamela Samuelson, *Comparing U.S. and EC Copyright Protection for Computer Programs: Are They More Different Than They Seem?*, 13 J.L. & COM. 279, 284 (1994) (stating that § 117 allows modification to run a program on a different machine).

189. 17 U.S.C. § 107; *see* Lewis Galoob Toys Inc. v. Nintendo of Am., Inc., 964 F.2d 965, 970-72 (9th Cir. 1992). The defendant Galoob was accused of contributory infringement for making and selling devices that enable Nintendo videogame users to create unauthorized derivative works. *See id.* at 967. Galoob manufactured a device called the Game Genie that was used to change features of the games. *Id.* The court denied that a derivative work existed and in the alternative applied the fair use doctrine. *Id.* at 967-72. *But see Micro Star*, 154 F.3d at 1113.

contract terms that restrict modification are likely to be enforced.[190]

Vertical restraints affecting repair and modification help sellers control the economic life of their products. Policy analysis of these restraints raises two interesting questions. First, do the restraints promote efficient repair and modification or instead wasteful obsolescence? Second, are the restraints necessary to assure IP owners capture an adequate reward in durable product markets?

IP owners would argue that restraints on reconstruction encourage efficient repair, and help support the high profit level required to induce innovation. The ability to block reuse eases the threat of competition from the secondary market.[191] The ability to control effective product life helps sellers escape a curse on durable product monopolists that prevents them from charging a monopoly price. Ronald Coase conjectured, and microeconomists later confirmed, that durable product monopolists have trouble sustaining a price above the competitive price, because they have trouble committing themselves to not price discriminate over time.[192] The prospect that price will fall over time discourages high valuation consumers from making an early purchase at a high price, and thus the seller's inability to commit to a high price leads to a relatively low initial price.[193] One solution requires the seller to convert the durable product into a perishable product.[194] Commitment to charge a high price is no longer a problem because high valuation users are repeatedly in the market along with all other users. The restraints discussed in this part have the effect of making products less durable, and they might be motivated by a desire to escape the Coase conjecture.[195]

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190. *See* Samuelson, *supra* note 188, at 284 (noting that such terms are more likely to be enforced in the United States than in Europe).

191. *See* JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 79-80 (1988) (demonstrating that the amount of the profit earned by a monopolist depends on the ease of recycling its output).

192. *See id.* at 72-74, 80-87 (1988) (explaining the Coase conjecture).

193. Thus, a durable good monopolist essentially "creates his own competition." *Id.*

194. *See id.* at 86-87. For example, West Publishing has largely shifted from making law books, a durable good, to providing subscription databases.

195. *Cf.* John Wiley et al., *The Leasing Monopolist*, 37 UCLA L. REV. 693, 694-96 (1990). This argument can be used to defend the position that mass-marketed software is licensed not sold. For a discussion of the debate about whether mass-marketed software should be characterized as licensed or sold, see Nimmer et al., *supra* note 31.

IP users would object that some restraints on repair and modification are socially harmful. These arguments are plausible in cases in which a second-hand market would increase output or when inefficient product life choices are made to overcome the Coase conjecture or support frequency of use pricing or some other form of price discrimination.[196] To make these objections convincing IP users should also argue that profit and incentive to innovate would not be harmed too much by constraining repair and modification restraints.

V. PACKAGES

IP owners sometimes insist that buyers and licensees take a package of products or licenses. Usually mandatory packages are profitable because they reduce enforcement or other transaction costs, or because they implement price discrimination.[197] The convenience of packaging is easy to see when IP owners hold a large portfolio of patents or copyrights. A radio patent pool held 570 patents and 200 applications.[198] ASCAP and BMI, the two largest music performance rights organizations, each control millions of music copyrights.[199] The role of packaging in price discrimination is a little more to difficult to see.

An example illustrates how packaging helps a seller achieve price discrimination. Suppose a company owns patents A and B that are of interest to two potential licensees X and Y. Suppose X would be willing to pay $2 for a license to A and $4 for a license to B. Suppose Y would be willing to pay $5 for a license to A and $3 for a license to B. If the patent owner sets separate fees for the licenses the price of A would be $5 and the price of B would be $3. Firm X would not take a license to A, and revenue would be $5 from patent A plus $6 from patent B for a total of $11. If the patent owner offered a package of A and B for a price of $6, then both X and Y would accept the package and the patent owner would have a revenue of $12.

196. *See* Meurer, *Price Discrimination*, *supra* note 13, at 101-02.

197. *See* Broadcast Music, Inc. v. Columbia Broadcasting Sys., Inc., 441 U.S. 1, 13-16 (1979) (noting that blanket music licenses save on enforcement and transaction costs); Meurer, *Price Discrimination*, *supra* note 13, at 11 (stating that ASCAP and BMI practice price discrimination).

198. *See* Automatic Radio Mfg. Co. v. Hazeltine Research, Inc., 339 U.S. 827, 829 (1950).

199. *See BMI and ASCAP Reject Licensing Legislation*, *at* http://www.ascap. com/press/1998/legislation-100898.html (Oct. 28, 1998).

Thus, the package gives more revenue to the patent owner and increases diffusion of the technology.[200]

Unlike the other vertical restraints discussed in this Article, IP law regulates packaging pretty much the same way that antitrust does.[201] The main tool of IP oversight is the misuse doctrine which follows antitrust doctrine regarding packaging quite closely.[202] The convenience of packaging makes courts reluctant to find antitrust liability[203] or apply the misuse doctrine.[204] Courts have displayed some hostility toward packaging that implemented price discrimination,[205] but that attitude is probably fading.[206] Only rare packaging cases where the plaintiff demonstrates a foreclosure or collusion facilitating effect are likely to violate antitrust laws or the misuse doctrine.[207]

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200. It is also possible to construct examples such that packaging increases profit but reduces total output. Suppose firm Z is added to the market as a potential licensee and it values A at $5/3 and B at $2. The optimal price for a package is still $6 which yields the same revenue of $12. If, however, the patent owner is required to set separate royalty rates, then the optimal rate for A is $5/3 and the optimal rate for B is $2 which yields a total revenue of $11. Thus, total revenue (or profit) declines, but output grows because firm Z takes the licenses when they are priced separately, but not when they are offered as a package.

201. *See* Meurer, *Price Discrimination*, *supra* note 13, at 121, 124 (describing limited circumstances in which copyright facilitates packaging).

202. *See* HOVENKAMP ET AL., *supra* note 6, § 3.3a.

203. *See* Broadcast Music Inc. v. CBS, Inc., 441 U.S. 1, 19-23 (1979) (approving BMI's licensing practices as a convenient means of marketing and enforcing public performance licenses).

204. *See* Automatic Radio Mfg. Co. v. Hazeltine Research Inc., 339 U.S. 827, 830-34 (1950) (finding no misuse because the royalty scheme achieved simplicity in accounting and was done for the convenience of the parties).

205. *See Broadcast Music Inc.*, 441 U.S. at 30-31 (Stevens, J., dissenting) (arguing that the blanket license implemented harmful price discrimination); Zenith Radio Corp. v. Hazeltine Research Inc., 395 U.S. 100, 134-35 (1969); United States v. Loew's Inc., 371 U.S. 38, 39 (1962).

206. *See* HOVENKAMP ET AL., *supra* note 6, § 22.6 (disapproving antitrust oversight of packaging designed to price discriminate).

207. *See id.* § 22.4a-b; Barry J. Nalebuff, *Bundling,* at 2 (Yale ICF Working Paper Series No. 99-14) *at* http://papers.ssrn.com/sol3/delivery.cfm/991013301.pdf? abstractid=185193 (Nov. 22, 1999) (packaging may cause exclusion when buyers have positively correlated valuations); Yannis Bakos & Erik Brynjolfsson, *Bundling and Competition on the Internet, at* http://pages.stern.nyu.edu/~bakos/bci.pdf (April 1999) (bundling may deter entry into markets for digital content).

VI. EXIT

IP regulation of exit restraints is broader than antitrust regulation, but like packaging restraints, the IP approach to exit restraints approximates the antitrust approach.[208] Exit restraints arise when contracting parties commit to a long-term relationship and commit not to deal with others. Such commitments can be an efficient way to encourage parties to invest in a relationship, but they occasionally pose a danger to competition.[209] That danger is elevated when one of the parties owns patents or copyrights that might lead to market power.[210] Patent law regulates certain restraints that impede a licensee's ability to exit his relationship with a patent owner through the misuse and preemption doctrines.[211] Copyright law has enacted compulsory licenses to moderate the danger that exclusive licenses can be used to create market power in downstream markets.

Patent law condemns as misuse contract terms that extend the patent beyond its expiration date.[212] This policy originates in *Brulotte*, a case in which the patentee sold a hop picking machine to farmers under a contract which required royalty payments after the patents covering the machine had expired.[213] Misuse also requires that when a patent owner licenses a package of IP rights containing U.S. patents the royalty rate must be reduced as patents in the package expire.[214]

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208. The goals pursued in *Brulotte v. Thys Co.*, 379 U.S. 29, 32 (1964) and *Lear Inc., v. Adkins*, 395 U.S. 653, 663-64 (1969), discussed *infra* in notes 212-19 and accompanying text, match antitrust goals, but derive from patent law rather than antitrust. *See* HOVENKAMP ET AL., *supra* note 6, § 23.2c.

209. *See* United States v. Am. Can Co., 230 F. 859, 874 (D. Md. 1916) (describing how a canning company secured domination of a market by contracing for the entire output of canning machine manufacturers, and also for assignment or exclusive licensing of their patents).

210. *See id.*

211. *See* Michael J. Meurer, Note, *An Economic Analysis of Royalty Terms in Patent Licenses*, 67 MINN. L. REV. 1198, 1201-11 (1983) (reviewing judicial restrictions on royalty terms).

212. HOVENKAMP ET AL., *supra* note 6, § 3.3b3.

213. 379 U.S. at 29.

214. *See* Meehan v. PPG Indus., 802 F.2d 881, 886 (7th Cir. 1986) (finding that royalty payments on United States sales under package license containing Canadian, American, and British patents must end when the American patent expires); Pitney Bowes, Inc. v. Mestre, 701 F.2d 1365, 1373 (11th Cir. 1983) (finding that royalty payments must fall under package license containing trade secrets and patents when patents expire); *cf.* Boggild v. Kenner Prods., 776 F.2d 1315, 1320-21 (6th Cir. 1985) (finding misuse in

Patent law preempts contract terms that purport to require royalties on an invalid patent. In *Lear, Inc. v. Adkins,*[215] Lear licensed a patented gyroscope from Adkins.[216] Lear stopped making royalty payments because it believed the patent was invalid, and Adkins brought suit.[217] The Supreme Court overturned a contract doctrine that estopped licensees from challenging the validity of a patent because patent law preempted the contract doctrine.[218] Later cases extended preemption to various contract terms that discourage validity challenges.[219]

In copyright protected markets, important policy concerns arise with exit restraints that are directed upstream at

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assignment agreement that required payments for twenty-five years regardless of whether patents issued and imposed the same use restrictions after patent expiration).

215. 395 U.S. 653 (1969).

216. *Id.* at 655.

217. *Id.* at 655-56.

218. *Id.* at 670-71.

219. *See* Bus. Forms Finishing Serv., Inc. v. Carson, 452 F.2d 70, 75 (7th Cir. 1971) (holding defendant's agreement to accept the validity of plaintiff's patent unenforceable); Massillon-Cleveland-Akron Sign Co. v. Golden State Adver., 444 F.2d 425, 427 (9th Cir. 1971) (refusing to enforce a covenant in which the licensee agreed not to contest the validity of the patents); Timely Prods, Inc. v. Costanzo, 465 F. Supp. 91, 99 (D. Conn. 1979) (finding a contractual arrangement in which the license would pay the same royalty rate whether or not the patent was valid contrary to the policies of federal patent law, and therefore unenforceable). Just before the creation of the Federal Circuit, the Supreme Court signaled a retreat from these cases in *Aronson v. Quick Point Pencil Co.*, 440 U.S. 257, 266 (1979). A patent applicant negotiated a license calling for five percent royalties that would be reduced to two and one half percent if a patent did not issue within five years. *Id.* at 259-60. The Court enforced the contract despite the tension with *Brulotte* and *Lear*. *See id.* at 264-66.

Brulotte and *Lear* are not popular with the Federal Circuit. *See* Flex-Foot, Inc. v. CRP, Inc., 238 F.3d 1362, 1368-70 (Fed. Cir. 2001) (upholding a settlement agreement not to challenge a patent's validity); Studiengesellschaft Kohle m.b.H. v. Shell Oil Co., 112 F.3d 1561, 1567-68 (Fed. Cir. 1997) (holding that "[n]othing in this license made payment of royalties contingent on the validity of [a] patent," and describing *Lear* as "echo[ing] from a past era of skepticism over intellectual property principles"); Foster v. Hallco Mfg. Co., 947 F.2d 469, 476-77 (Fed. Cir. 1991) (enforcing a consent decree on grounds that *Lear* does not abrogate principles of res judicata); Hemstreet v. Spiegel, Inc., 851 F.2d 348, 350-51 (Fed. Cir. 1988) (enforcing a litigation settlement to pay royalties regardless of enforceability of patent claims); Universal Gym Equip., Inc. v. ERWA Exercise Equip., Ltd., 827 F.2d 1542, 1550 (Fed. Cir. 1987) (upholding a contract to pay royalties for use of an unpatented design). As a result, careful contract drafting usually avoids the threat of misuse or preemption.

creators. An interesting example comes from the player piano industry. In early twentieth century America, piano rolls were a major source of revenue for the music industry.[220] A firm named the Aeolian Company dominated the market for piano rolls and for player pianos.[221] In the first decade of the century, Aeolian signed deals with several music publishers that granted Aeolian the exclusive right to make piano rolls using the songs in their catalogues.[222] Interestingly, these contracts were negotiated when the player piano was a relatively new technology, and there was uncertainty whether piano roll makers needed copyright permission. The Aeolian contracts were contingent on the courts or Congress establishing that piano rolls were subject to music composition copyrights. The Supreme Court decided piano rolls were not infringing copies because they were not *fixed* within the meaning of the 1870 Copyright Act.[223] Composers and music publishers lobbied Congress to make piano rolls subject to copyright law, and partially succeeded; Congress extended copyright law to cover mechanical reproductions of music.[224] Player piano and piano roll competitors of Aeolian also lobbied Congress seeking relief from the market power Aeolian would get from its exclusive contracts. Congress responded by combining the mechanical reproduction right with a compulsory license provision that effectively nullified the exclusionary term in the Aeolian

220. *See* Nimbus Records, *Grand Piano—A Technical Outline of the Reproducing Piano*, *at* http://www.wyastone.co.uk/nrl/gp_tech.html (last visited Feb. 28, 2003) ("Between 1915 and 1930 the Reproducing Piano was very big business.").

221. *Id.* ("In its peak year, 1925, more than 192,000 domestic instruments were manufactured by the Aeolian Company in the USA, with a total sales value of $59,000,000."). *But see* Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1309 (1996) (questioning whether Aeolian Company dominated the player piano industry around the time of the 1909 copyright revisions).

222. *See* Theresa M. Bevilacqua, Note, *Time to Say Goodbye to Madonna's American Pie: Why Mechanical Compulsory Licensing Should Be Put to Rest*, 19 CARDOZO ARTS & ENT. L.J. 285, 290 (2001). Furthermore, the company "made every effort to perfect and enhance their invention, and throughout this period they kept the most famous pianists under contract." Nimbus Records, *supra* note 220.

223. *See* White-Smith Music Publ'g Co. v. Apollo Co., 209 U.S. 1, 15-18 (1908).

224. *See* PAUL GOLDSTEIN, COPYRIGHT'S HIGHWAY: FROM GUTENBURG TO THE CELESTIAL JUKEBOX 65-67 (1994); Jessica Litman, *Copyright Legislation and Technological Change*, 68 ORE. L. REV. 275 (1989).

contracts.[225]

IP regulation of exit restraints presents the same basic policy concerns presented by antitrust regulation.[226] Certain exit restraints are used to deter entry or raise the costs of competing with the firm that imposes the restraints, but most exit restraints advance some efficiency goal.[227] The difficult question is how to deter harmful restraints without discouraging efficient restraints. For example, restraints like those in *Brulotte* might have an anticompetitive effect similar to certain long-term requirements contracts,[228] or they might simply implement a convenient payment method for liquidity constrained users.[229] Similarly, restrictions on challenges to the validity of a patent might preserve an entry barrier based on an invalid patent, but they also promote efficient settlement of litigation.[230] The compulsory licensing approach used in copyright is quite difficult to manage effectively because of the twin problems of deciding when a compulsory license is

225. *See* GOLDSTEIN, *supra* note 224, at 66-67. The relevant provision of the current copyright statute is 17 U.S.C. § 115 (2000), which gives a compulsory license to a music composition copyright to anyone who independently records a composition after the first authorized copy is released. *See* Alan M. Fisch, *Compulsory Licensing of Blacked-Out Professional Team Sporting Event Telecasts (PTSETS): Using Copyright Law to Mitigate Monopolistic Behavior*, 32 HARV. J. ON LEGIS. 403, 417-428 (1995) (discussing Aeolian and more recent examples of copyright compulsory licenses as tools for mitigating harm caused by the exercise of market power).

226. Antitrust regulates forced exclusive dealing on principles similar to those followed in *Brulotte* and its progeny. For a discussion of antitrust regulation of exclusive dealing in IP protected markets, see generally HOVENKAMP ET AL., *supra* note 6, at §§ 21.3c, 21.7c (discussing foreclosure and other social harms, and competitive rationales). Several scholars at this Symposium discuss the issues and implications of *Lear* on antitrust regulation of the patent settlement. *See generally* Thomas F. Cotter, *Refining the "Presumptive Illegality" Approach to Settlements of Patent Disputes Involving Reverse Payments: A Commentary on Hovenkamp, Janis, and Lemley*, 87 MINN. L. REV. 1789 (2003); Herbert Hovenkamp et al., *Anticompetitive Settlement of Intellectual Property Disputes*, 87 MINN. L. REV. 1719 (2003); Maureen A. O'Rourke & Joseph F. Brodley, *An Incentives Approach to Patent Settlements: A Commentary on Hovenkamp, Janis & Lemley*, 87 MINN. L. REV. 1767 (2003).

227. *See* SULLIVAN & GRIMES, *supra* note 8, § 7.3b.

228. *See* Brulotte v. Thys Co., 379 U.S. 29, 32-33 (1964).

229. *See* BOWMAN, *supra* note 6, at 227-38; Meurer, *supra* note 211, at 1217-22 (asserting that the leveraging argument in *Brulotte* is not persuasive).

230. *See* Rochelle Cooper Dreyfuss, *Dethroning* Lear*: Licensee Estoppel and the Incentive to Innovate*, 72 VA. L. REV. 677, 718-24 (1986); Meurer, *supra* note 211, at 1209.

appropriate, and fixing an appropriate royalty rate.[231]

CONCLUSION

IP law is much more active than antitrust law in regulating vertical restraints in IP protected markets.[232] Vertical restraints are implemented through contract, IP enforcement, and product design. Antitrust regulates vertical restraints by condemning contract terms that are judged anticompetitive. IP law often takes a similar approach, condemning certain contract terms through application of the misuse and preemption doctrines. But IP law has two additional means of influencing contract based restrictions. It encourages vertical restrictions by bolstering contract remedies with IP remedies when a user violates a use restriction, and it provides default terms to fill incomplete contracts. Furthermore, IP facilitates vertical restraints by granting IP rights against strangers who might interfere with the restraints by playing the role of arbitrageur or materially assisting an act of infringement. IP law inevitably must be more active than antitrust in regulating vertical restraints—the law must specify rules about what kinds of uses are

231. *See* Merges, *supra* note 221, at 1308-16 (criticizing the mechanical license because the license fee is set without regard to market forces).

232. An important topic for future research is the question of how IP regulates horizontal restraints compared to antitrust law. My impression is that the differences are not as striking as they are in the case of vertical restraints. Some examples of intellectual property law doctrines that regulate horizontal competition include: the copyright fair use doctrine which encourages reverse engineering, *see, e.g.*, *Sega Enter. v. Accolade Inc.*, 977 F.2d 1510, 1520-22 (9th Cir. 1992); the idea-expression dichotomy, *see, e.g.*, *Baker v. Selden*, 101 U.S. 99, 100-04 (1879); the merger doctrine and related copyright doctrines that preclude copyright protection of functional aspects of computer programs, *see, e.g.*, *Lotus Dev. Corp. v. Borland Int'l*, Inc., 49 F.3d 807, 815 (1st Cir. 1995), *aff'd by an equally divided Court*, 116 S.Ct. 804, 814-19 (1996); *Computer Assocs. Int'l, Inc. v. Altai, Inc.*, 982 F.2d 693, 706-12 (2d Cir. 1992); SULLIVAN & GRIMES, *supra* note 24, § 15.4b (noting the role of copyright law in regulating competition in the computer industry); the patent statutory bar provision of 35 U.S.C. § 102(b), which protects firms from hold-up based on a patent suit when the invention appears to be in the public domain, *see, e.g.*, *Gen. Elec. Co. v. United States*, 654 F.2d 55, 61-62 (Ct. Cl. 1981); the first inventor defense against business method patent infringement, *see, e.g.*, 35 U.S.C. § 273; the trademark doctrines allowing fair use, *see, e.g.*, *Zatarain's, Inc. v. Oak Grove Smokehouse, Inc.* 698 F.2d 786, 791-92 (5th Cir. 1983), and invalidating generic marks, *see, e.g.*, *Murphy Door Bed Co., v. Interior Sleep Sys.*, Inc., 874 F.2d 95, 100-02 (2d Cir. 1989); and the functionality defense against trade dress infringement, *see, e.g.*, *Wal-Mart Stores, Inc. v. Samara Bros., Inc.*, 529 U.S. 205, 209-16 (2000).

infringing.

Product design choices implement vertical restraints through technological ties. Antitrust only weakly regulates product design decisions. Courts are reluctant to recognize tying claims based on product design choices because they fear they will discourage socially valuable innovation. In contrast, IP law actively regulates technological ties, it encourages ties by protecting product interfaces through patent, trade secret, and anticircumvention law, and it discourages ties by promoting reverse engineering intended to discover product compatibility requirements. Furthermore, patent and copyright promote price discrimination by restricting product modifications that aid arbitrage against price discrimination.

Reviewing six types of vertical restraints, it appears that IP law offers more extensive regulation of every type except perhaps packaging and exit. Regulation of packaging through patent misuse basically mimics antitrust regulation of packaging.[233] Patent law oversight of exit restraints comprises the rules from *Brulotte* against post-expiration royalties and from *Lear* against terms that prevent patent challenges. Neither patent nor antitrust courts are likely to expand these rules; courts are disposed to believe exit restraints enhance efficiency and are unlikely to condemn other exit restraints absent a strong showing of harm to competition.[234]

IP law regulates the other four types of restraints more extensively than antitrust because: the rent-seeking costs of opportunistic and anticompetitive litigation are smaller; it uses regulatory instruments other than simple prohibitions; and it shows greater concern about the welfare effect of end use restrictions. IP doctrines that discourage vertical restraints generally cause smaller rent-seeking problems than antitrust doctrines with a similar effect. IP rules that provide background entitlements are relatively clear compared to antitrust rules which require uncertain rule of reason analysis. Furthermore, IP prohibitions that are implemented through

233. Copyright law facilitates packaging to a small degree by impeding unbundling of a package. *See* Meurer, *Price Discrimination*, *supra* note 13, at 120-21.

234. Recent antitrust "cases suggest a skepticism toward claims of forced exclusive dealing, restricting recovery to cases in which the defendant has foreclosed a substantial percentage of the market." *See* HOVENKAMP, *supra* note 58, § 7.3d. The Federal Circuit appears hostile to *Brulotte* and *Lear* and reads them narrowly. *See* Dreyfuss, *supra* note 230, at 693-707; *supra* note 219.

preemption or misuse do not give rise to treble damages, and can only be used defensively. In contrast, broad antitrust regulation of vertical restraints creates a threat of opportunistic suits because of uncertainty, the lure of treble damages, and the possibility of initiating a suit against a vulnerable defendant.[235] The greater reach and wider policy concerns of IP law are reflected in doctrines that affect price discrimination, product durability, and sharing. Many IP doctrines promote or discourage price discrimination by tolerating or discouraging arbitrage. Certain IP doctrines regulate repair and modification and affect the profit that can be earned by IP owners who are durable product monopolists. Finally, various copyright doctrines encourage or discourage users from forming coalitions that can bargain more effectively with copyright owners.

235. *But see* HOVENKAMP ET AL., *supra* note 6, § 21.3f (arguing that the misuse doctrine is applied too aggressively); Mark A. Lemley, *Beyond Preemption: The Law and Policy of Intellectual Property Licensing*, 87 CAL. L. REV. 111, 145 (1999) (arguing that pre-emption lacks nuance); Mark A. Lemley, *The Economic Irrationality of the Patent Misuse Doctrine*, 78 CAL. L. REV. 1599, 1615-18 (1990) (arguing that misuse overdeters).